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# USSR Report

TRANSPORTATION

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14 August 1985

# USSR REPORT

## TRANSPORTATION

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## CIVIL AVIATION

### OFFICIAL ON WORK OF SIBAEROPROYEKT INSTITUTE

Moscow VOZDUSHNYY TRANSPORT in Russian 14 Feb 85 p 1

[Article by V. Kondakov, chief of "Sibaeroprojekt" [Siberian branch of "Aeroprojekt" State Planning and Surveying and Scientific Research Institute] in Krasnoyarsk: "The Lights of Siberian Airports"]

[Text] Our Krasnoyarsk Kray stretches from the ancient Sayan Range in the south to the seas and archipelagoes of the Arctic Ocean. Development of productive forces and industrial assimilation of the vast region's natural wealth have required a developed network of airports to meet the increasing needs of the national economy. This is why a planning organization--the "Sibaeroprojekt" institute--was established in Krasnoyarsk in January 1975. The sphere of activity of the new "Aeroprojekt" branch includes not only Krasnoyarsk Kray, but the Tyumen, Tomsk and Novosibirsk oblasts, Altay Kray, the Tuva ASSR and part of the Yakut ASSR.

Today, in evaluating the past decade, I would like to dwell on the creative and businesslike relationships which have taken shape between the "Sibaeroprojekt" collective and enterprises of the Krasnoyarsk Civil Aviation Administration. The basic document in our work is the plan for overall development of the Krasnoyarsk Administration up to the year 2000, drafted at the end of the 1970's by planning and scientific research institutes of the sector. Under the procedure for implementing this plan, a number of projects, including airport complexes, air terminals and manmade runways, have been built.

Many projects for construction and improvement of the region's airport network already have been completed. Construction and renovation of airports in Shushenskoye, Igarka, Novobirilyussy, Dzerzhinskiy and several other cities have been completed or are nearing completion. Other projects are in the renovation and technical reequipment stage--in Norilsk, Abakan, Kyzyl, Tura, Turukhansk and Baykit, where the plan for overall development provides for the utilization of new types of airplanes and helicopters. Speaking of the solution of such complex tasks, it would be incorrect not to mention the difficulties being encountered.

Thus, despite all the Krasnoyarsk Administration's efforts, construction of air terminals at the Shushenskoye and Igarka airports has been delayed, operation of the Sharypovo airport has begun under a temporary arrangement, Gornyy Airport in Tura does not have facilities for ground services, and so forth.

Every year several airports are being built and renovated in Krasnoyarsk Kray for new types of aircraft. Renovation and technical reequipment, as a rule, are conducted in stages--without stopping airport operation. A typical example of such an approach is the renovation of Alykel' Airport in Norilsk. Additional capital investments had to be made there for construction of a temporary apron, but then this made it possible to operate the airport normally during the renovation period.

In beginning the planning of new air terminals for local air routes, we strive to more fully utilize the closest bases of the construction industry and local as well as traditional construction materials. A vivid example may be the air terminal project at the Todzha airport, located in the center of the Tuva ASSR. The most natural construction material here is timber. In Todzha, in our view, we have been able to successfully combine the structural potentialities of wood with the capacity planning and esthetic development of the terminal.

"Sibaeroprojekt" often designs airports at new territorial-industrial complexes. Who is not aware, for example, of the name of the Kansk-Achinsk Power Complex in Eastern Siberia--KATEK? It is an area of 60,000 square kilometers. KATEK consists of coal deposits, one-fourth of which are suitable for open-pit mining; it consists of high-power plants for the overall processing of coal; it consists of the largest GRES's [state regional electric power stations] and power transmission lines; and it consists of new cities. The entire country is building KATEK.

The capital of KATEK--Sharypovo--now has air service with the kray center of the Krasnoyarsk region and with other cities in Irkutsk, Kemerovo and Novosibirsk oblasts. This was preceded by a great deal of work by the collective of "Sibaeroprojekt."

The fact that the airport was situated on land with very complex geological engineering and hydrological conditions caused difficulty in planning. Planners were confronted with such tasks as draining parts of a swamp, putting fill on land made up of waterlogged peat and affected by severe frost heaves as well, construction of a drainage canal, and other factors.

The Sogrenskiye swamps also gave construction workers many surprises when they were building the airfield. However, the many visits by specialists for supervision and the workers' skill and persistence made it possible to cope with the most difficult task.

Quite a few problems also faced us in planning Alykel' Airport in Norilsk. Here it was necessary to provide reinforcement for the severely deteriorated pavement, look for material to lengthen the runway, and take into account the complexity of construction under the conditions of the Polar North's severe climate and permafrost. Beginning in 1985, Alykel' will be able to accommodate Il-62 and Il-86 aircraft.

In recent years, the trend toward planned reduction of operations for planning runways and a corresponding increase in operations connected with construction of radio navigation and communications projects and with technical reequipment of airport services has been looked over efficiently. This is natural: construction of airports is begun with the runways, and the "land" lags behind at first. In this situation, the problem of setting limits for individual projects becomes more acute.

After marking the 10th anniversary of "Sibaeroprojekt" recently, the institute's collective is continuing to operate successfully. The tone of the work is being set as always by our veterans--leading specialists N. Potylitsina, R. Borodina, R. Yegorova, O. Orlova, A. Tolstolugov, V. Shchigolev and many others.

The branch's collective understands well that the time of formation has ended, and that more complex tasks in the planning and renovation of airports operating in Krasnoyarsk Kray and Western Siberia are rising in their full height before us.

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CIVIL AVIATION

USSR BEGINS TESTS OF V-3 'SOKOL' HELICOPTER

Moscow TRUD in Russian 27 Mar 85 p 3

[Interview with Roman Kalinowski, deputy chief designer and technical director of the V-3 "Sokol" helicopter project; Sergey Popov, GosNIIGA [State Scientific Research Institute of Civil Aviation] test pilot; and Jerzy (Diczkowski), test pilot of the Polish Swidnik enterprise, by TRUD correspondent N. Dombkovskiy at the GosNIIGA outside Moscow on 26 March: "The 'Sokol' Learns to Fly"]

[Text] Testing of the V-3 "Sokol" helicopter, manufactured in the Polish People's Republic to order for Aeroflot, was begun yesterday at the State Scientific Research Institute of Civil Aviation.

...Alongside the gigantic Mi-26, testing of which is now being completed at the GosNIIGA, the "Sokol" seems tiny at first. But upon approaching closer you see that the first impression is deceptive. The beautiful proportions, abundance of windows and unusual paint scheme give it light weight and dash. On the eve of the first takeoff, we talked at the helicopter with the designers and test pilots.

The first to speak was the deputy chief designer and technical director of the project, Roman Kalinowski.

[Roman Kalinowski]: It should be said that the aircraft industry in our native Poland is already experienced in manufacturing helicopters. At one time, several original designs were made, and in recent years we have been turning out the Mi-2 helicopters in accordance with Soviet specifications. But this aircraft has special significance for us. As a matter of fact, the "Sokol" is the first helicopter we have designed for series production.

Within the framework of socialist integration, we have been charged with building an aircraft to take the place of the veteran Mi-4, which has been performing excellently in many countries of the world.

Our enterprise, Swidnik, makes transport aircraft. The "Sokol" also was created in its design bureau, under the leadership of Chief Designer Stanislaw Kaminski. We took the classic layout in accordance with which the Mil' helicopters were built as a basis. There are several reasons for this. Firstly, as I have said, we are experienced in manufacturing the Mil' aircraft. Secondly,

this simpler single-rotor design with a tail rotor enables us to achieve better results, in our opinion. "As far as I myself am concerned," Roman Kalinowski continues, "I am very satisfied to consider myself an alumnus of the Soviet school of aircraft design; I was lucky enough to complete the Moscow Aviation Institute, you know."

...In working on the aircraft, the Polish comrades were continually aware of the assistance and support of Soviet designers. All assemblies of the helicopter were designed and manufactured at Swidnik, but at any time that problems arose, the aircraft builders from the Polish People's Republic were able to obtain skilled consultation with their Soviet colleagues. They speak with particular respect of the general designer of the OKB [Special Design Bureau] imeni M. L. Mil', Marat Nikolayevich Tishchenko, and consider his advice invaluable.

...They are readying the helicopter for flight. S. I. Popov, test pilot for the GosNIIGA, and J. (Diczkowski), test pilot for Swidnik, are sitting at the controls.

The pilots share their impressions a half hour after landing.

Sergey Popov:

This is the 13th type of helicopter I have flown. My first impression is that the aircraft is light, maneuverable, and behaves well in the air. True, there are certain observations, but we are also working to correct them. We have a big program ahead--we will be teaching the "Sokol" to fly in a strong wind, in the heat and cold, and under conditions in high mountains and natural icing.

Jerzy (Diczkowski):

The "Sokol" is my favorite aircraft; I've flown about 200 hours in it at the plant. Now our task is to reach the parameters calculated. The helicopter should carry up to 2,100 kilograms of cargo, climb to an altitude of 6 kilometers, and fly at a speed of 265 kilometers per hour.

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CIVIL AVIATION

Yak-42 SERVICE FROM SARATOV PERMITS NONSTOP FLIGHTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Mar 85 p 4

[Report by correspondent V. Lifanov from Saratov: "The Yak-42 Is Airborne"]

[Text] One is not aggravated with winter when it is summer. And so the question is how a vacationer flies away "from the nice north to a southern place" without ordeals and aggravation. It is no secret, after all, that our aspirations far from always coincide with Aeroflot's capabilities. But judging from appearances, passengers' concerns will be alleviated: the Yak-42 aircraft, which meets the highest demands for operation, is appearing on the route. It promises each one of the 120 passengers a safe flight without fatigue.

We, the journalists, familiarized ourselves with the capabilities of this aircraft in proving flights on the Saratov-Krasnodar and Saratov-Mineral'nyye Vody routes. Regular service began here on 1 March.

To begin, I will explain why it is from Saratov. Precisely because the plant which manufactures the new aircraft is located in the city on the Volga. So who else if not local aviators, with their navigation charts in hand?

"There was also a more important reason for such a decision, of course," says V. Pogorelov, chief of the flight department of the Volga Civil Aviation Administration. The Saratov joint aviation detachment is one of the best in the ministry. In addition, many of the pilots, navigators and flight engineers, following the example of their commander, Honored Pilot of the USSR V. Peremot, were retrained in advance for the Yak-42."

"We will master the Krasnodar and Mineral'nyye Vody routes," Yu. Davydov, the detachment's deputy commander, shares his plans, "and we will switch over to Sochi and Simferopol', where the passenger flow is especially heavy."

It is worth noting that previously there were no direct flights to these cities from Saratov. The An-24 had to land at intermediate points for technical reasons. In the process, not only time, but a significant part of the fuel, was "eaten up." Now there is no need for this: the Yak-42 is able to remain airborne for hours. Incidentally, about the fuel. The new airliner, according to specialists, is the most economical in its class.

But the advantages don't end here. It turns out that a runway no longer than 1,800 meters is adequate for the Yak-42, with its substantial weight and imposing "shape," whether during summer or winter. That is, it can "adapt" to even the average airports.

It is not simple for one who is not a specialist to understand the details of how powerful the SAU--the automatic flight control system--is. But we have a good guide--the aircraft commander, Pilot First Class N. Lebedev:

"Here is the instrument panel. All instruments on it have double or triple redundancy for backup. The digital computer has great capabilities. Other flying and navigational aids will not make errors, either..."

"Previously," Nikolay Yemel'yanovich adds, "I flew the Tu-134. A good aircraft. But I like the Yak-42 better, all the same."

We return to the comfortable, well-equipped cabin, where things are taking their normal course. Incidentally, there are innovations here, too. Flight attendants M. Sil'nova and T. Medvedyeva are carrying souvenirs around on a cart: aviation is helping commerce.

The time flew by inconspicuously. A soft landing, and we are in Mineral'nyye Vody. Leaving the hospitable aircraft, we wish all its future passengers a soft landing and a pleasant flight.

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CIVIL AVIATION

BRIEFS

KRIVROY ROG FLIGHTS EXPANDED--Krivoy Rog, 20/Feb--A Krivoy Rog-Stavropol run has begun the introduction of new air routes which this year will unite the largest ore mining and metallurgical center of the Ukraine with another 18 cities in the country. "This includes," says V. N. Ugrinovich, the Krivoy Rog Airport chief, "air bridges which will be directed to Magadan, Kuybyshev, Voronezh, Rostov-on-Don, Murmansk and Krasnoyarsk. Planes from the Krivoy Rog ore mining basin will carry a total of more than 100,000 passengers annually to dozens of cities in the country." [By DNEPROVSKAYA PRAVDA correspondent S. Chudakov] [Text] [Moscow PRAVDA in Russian 21 Feb 85 p 2] 8524

L-410 SERVICE IN KHABAROVSK--Khabarovsk--from the Far East Administration. An L-410 airplane landed for the first time at the local Khabarovsk airline airport. Only the kray center's main airport accepted these planes up to now. After directing this technical run, A. Budnik, the senior inspector of the Far East Administration, stressed that the flight of the new L-410 to the "small port" signifies the first stage in the replacement of AN-2 airplanes on local airlines with modern L-410 and AN-28 microliners, whose entry into service is expected in the near future. By that time the L-410 will replace the "Annushka" on the Khabarovsk-Kherpuchi line. The runway of the Khabarovsk local airline enterprise has been lengthened and widened for this reason and, in the near future, its equipment will be set up with modern radio facilities. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 7 Mar 85 p 3] 8524

NEW TURKESTAN AIRPORT OPENS--Turkestan (Chimkent Oblast)--The new airport in the city of Turkestan has received its first passengers. The air terminal building was constructed in accordance with national architectural traditions. A mother-and-child room, snack bars, a restaurant, and a movie hall have been opened here. Air terminals have been commissioned in Arkalyk and Semipalatinsk since the beginning of the five-year plan in Kazakhstan. Airports are also being constructed in Ekibastuz, Aktyubinsk and Shevchenko. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 10 Mar 85 p 1] 8524

SOVIET, SPANISH AVIATION OFFICIALS MEET--(TASS)--On 29 March, Minister of Civil Aviation B. P. Bugayev received the Spanish Minister of Transportation, Tourism and Communications, Enrique Carlos Baron, who was in the USSR on an official visit. During their conversation, which took place in a friendly and constructive atmosphere, they exchanged opinions on questions concerning Soviet-Spanish cooperation in the air communications sphere and prospects for their further growth. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 30 Mar 85 p 1] 8524

SOVIET-ITALIAN AVIATION ACCORD--Rome, 2 Apr(TASS)--USSR Minister of Civil Aviation B. P. Bugayev and the Italian Minister of Transport and Civil Aviation C. Signorile, in the name of the governments of their two countries, signed an agreement in Rome significantly broadening the framework of Soviet-Italian cooperation in the field of air service. The signing of this document on the eve of the 20th anniversary of the establishment of regular air service between the USSR and Italy is the result of many years of mutually advantageous cooperation by the civil aviation entities of the two countries in providing economic, cultural, scientific and technical, and tourist ties. Passenger and freight transportation has grown considerably over the past few years and Aeroflot and Alitalia flights connecting Moscow with Rome and Milan have increased in frequency. This agreement opens up further broad possibilities for Aeroflot and Alitalia to more fully satisfy the constantly growing demand for transportation and to provide for the introduction of comfortable wide-bodied planes on the lines. This development will also secure the cooperation of both airlines in operating the Trans-Siberian route between Italy and Japan which is the shortest and safest of the existing ones. The agreement contains a number of clauses providing for the further development and broadening of aviation ties between the USSR and Italy. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 4 Apr 85 p 1] 8524

IL-86 SERVICE TO SOCHI BEGINS--It is very likely that the Sochi Airport collective had never before experienced such tension as this year. Intensive preparation went on for receiving the IL-86. Each service strove to approach this crucial period fully armed. The first test was the technical run which demonstrated that the Sochi air people had basically fulfilled the projected work volumes, mastered a new technological process, and prepared production and personnel. Now the long-awaited day had come. On 15 April, the IL-86 arrived here from Moscow by flight 1011. Still another run by the airbus was made on this very same day. Its frequency will increase to three flights by the end of April and it will reach 10-11 flights per day during the heavy summer transportation period. Regular Yak-42 Sochi-Saratov passenger flights also began on 15 April. [By VOZDUSHNYY TRANSPORT correspondent G. Kostenko] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 18 Apr 85 p 1] 8524

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## MOTOR VEHICLES AND HIGHWAYS

### MINISTRY REVIEWS MOTOR VEHICLE INDUSTRY 1984 WORK, 1985 PLANS

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 3, Mar 85 pp 1-3

[Article: "The Branch at the End of the Five-Year Plan"]

[Text] A joint session of the Ministry of the Motor Vehicle Industry Collegium and the Presidium of the Central Committee of the Union of Motor Vehicle, Tractor and Agricultural Machine Building Workers has taken place in Moscow. Representatives of the branch's labor collectives, as well as those of allied supply ministries and party and union organizations, took part in its work. In the session, the results of the work of the fourth year of the 11th Five-Year Plan were examined, and tasks were set and socialist obligations discussed and approved for 1985, its final year.

It was emphasized in the report and in statements that in 1984 an absolute majority of the enterprises in the branch as a whole basically was able to cope with the tasks set for the branch for that year. In particular, the assigned growth in production volumes of all types of products was secured, and socialist obligations for over-the-plan increase in labor productivity and reduction in the cost of goods produced were significantly (by 0.8 and 0.42 percent) overfulfilled. Discipline noticeably increased in the observance of contractual obligations and the fulfillment of plans connected with the USSR Food Program.

Thus, of the basic products of the branch, motor vehicles of all types and models were supplied to the national economy in a quantity that exceeded the plan by 360 million rubles, spare parts for motor vehicle equipment by 27 million rubles and consumer goods by more than 260 million rubles. In subsidiary agricultural economies, calculating on one worker, 2.6 kilograms of meat were obtained, which exceeds the level achieved in 1983 by 63 percent.

As we see, the results are imposing enough. They are the result of more stable operation than in previous years on the part of all the labor collectives of motor vehicle engineers as well as enterprise-suppliers of raw materials, materials and component goods. For example, in the last year the Belorussian Motor Vehicle Works collective worked very urgently on expanding production of the family of superheavy quarry dump trucks with weight carrying capacities of 75, 110 and 180 tons; the AZLK [Moscow Motor Vehicle Works imeni Lenin Komsomol], VAZ [Volga Motor Vehicle Works] and ZAZ [Zaporozhye Motor Vehicle Works] collectives worked on mastering essentially new models of passenger cars, those of the

Minsk, Kremenchug imeni 50th Anniversary of Soviet Ukraine and Ural imeni 60th Anniversary of the USSR Motor Vehicle Works on new trucks, including those for the needs of the agro-industrial complex, those of the Lvov Truck-Loader Plant on a modernized diesel truck loader with a capacity of 5 tons, those of the Kutaishi Motor Vehicle Works imeni G.K. Ordzhonikidze on technological truck trains for the village, those of the Tiraspol and Irbit Trailer Plants on refrigerated and closed semitrailers for loose fertilizers... In a word, all the enterprises really made their own worthy contribution to the high 1984 results. A socialist competition in honor of the 60th anniversary of Soviet motor vehicle engineering played a large role in this matter; tens of thousands of workers, thousands of brigades and hundreds of shops and industries fulfilled their annual production plans just for the anniversary of the branch.

The high production indicators achieved by the labor collectives has been highly appraised by the party and the government. Not long ago the Kama Association for the Production of Large-Load Trucks was awarded the Order of Lenin; the Eleventh State Bearing Plant (GPZ-11) and the Orsk Tractor Trailer Plant were awarded orders of Labor Red Banner; hundreds of the foremost people in industry were decorated with orders and medals of the USSR, nine branch workers were awarded the USSR State Prize, and six got the highest award of Soviet trade unions--the Prize imeni A. Kh. Busygin.

Thus 1984, as was recorded in the socialist obligations, became a good base, a reliable "starting block" for 1985--the concluding year of the 11th Five-Year Plan, and motor vehicle engineers obtained the material base for the unconditional fulfillment of the party's directions on the further intensification and increased effectiveness of production, on the acceleration of scientific-technological progress and on comprehensive conservation of all types of resources. The work done in anticipation in 1984 is also a base for the successful struggle to mark worthily the 27th CPSU Congress, the 40th anniversary of the victory of the Soviet people in the Great Fatherland War and the 50th anniversary of the Stakhanov movement. Evidence of this is the increased socialist obligations for 1985 that were discussed and adopted by the collectives of the associations, enterprises and organizations of Minavtoprom and unanimously approved at the enlarged session of the board of the ministry and the presidium of the central committee of the workers of motor vehicle, tractor and agricultural machine building.

In accordance with the new obligations, the 1985 branch quota for volume of production realized is slated for early completion, by 30 December. Thus, in excess of the plan not less than 5 million rubles worth of spare parts for motor vehicle equipment will be produced, as well as 3 million rubles worth of tractor electrical equipment and 300,000 bearings; not less than 30 million rubles of profit will be obtained in excess of the plan. The entire increase--planned and in excess of the plan--in the volume of production output at operating enterprises, in industries, shops and brigades is secured by growth in labor productivity, which exceeds that planned by not less than 0.5 percent. The cost of the equipment produced will be reduced by 25 million rubles, as well as consumption of raw materials, materials and fuel-energy resources for its production; answering the call of the party in deed, branch workers intend to work two days a year on saved materials and energy alone.

As in the fourth year of the five-year plan, strict attention is being paid in the socialist obligations to the discipline of observing contractual obligations and, with respect to the most important state programs, fulfilling them ahead of schedule. Deliveries for the country's agro-industrial complex can serve as an example; it has been resolved to supply motor vehicle equipment for it and spare parts for vehicles, tractors and trailers only ahead of schedule. Management assistance to kolkhozes and sovkhozes will be intensified in the development of their material-technical base, the mechanization of all branches of agricultural production, including animal husbandry, and the repair of motor vehicle and other transport equipment.

In spite of the fact that the branch has achieved a sufficiently high level in the production of consumer goods (for example, in 1983 for every ruble in the wage fund, 2.32 rubles worth of them was produced), the obligations stipulate further growth in the production of such goods. It is enough to say that in 1985 the range of products will also be expanded by 50 titles and production will increase of the popular self-defrosting ZIL refrigerators, Minsk MMVZ-3-1121 motorcycles, youth bicycles (Atig Machine Building Plant) and children's Sparite-3 bicycles (Daugavpils Drive Chain Plant) and many other products. Over-the-plan production will comprise 500 refrigerators, 300 mopeds and 3500 bicycles.

Much also remains to be done for the social development of the branch itself--improvement in housing conditions, cultural and welfare facilities and medical services for its workers, improvement in working conditions, etc. For example, no less than 1.2 million square meters of housing area, 6,700 places in children's preschool facilities, 9,000 places in general education schools, 570 hospital beds, polyclinics to see 2,280 patients per shift, 2840 places in professional-technical training schools and 650 places in sanatorium-dispensaries will be commissioned in a year. Significant attention is being paid to improving the qualifications of workers; 1460 more people will master flexible production systems and modules, industrial robots and machine tools with ChPU [Numerical Programmed Control] and microprocessor equipment and 540 of them will be top-notch repairmen for servicing and repairing automated systems. In all, 27,000 people will improve their qualifications. Almost 27,000 workers will be freed from heavy and manual labor by mechanization and improved organization of production; the number of women working night shifts will be sharply reduced. The number of subsidiary farm operations will increase to 140, which is almost 10 percent more than in 1983, and the area of arable land occupied by them will increase to 110,000 hectares, which is a 12 percent increase. They will produce no less than 11,200 tons of meat, 7,300 tons of milk and more than 65,000 tons of potatoes and vegetables.

Even such a short list of advances to be achieved in the concluding year of the five-year plan attests to the fact that the obligations assumed by the motor vehicle engineer collectives are not simple, either in terms of the breadth of problems encompassed or their volumes.

Thus, in 1985 virtually all motor vehicle plants will increase the output of their basic product--motor vehicles. At the Belorussian Motor Vehicle Works this is the quarry dump trucks BelAZ-7519 and BelAZ-7521 (carrying capacity 110 and 180 tons respectively); at GAZ [Gorkiy Motor Vehicle Works] it is vehicles operating on compressed natural gas, the modernized passenger cars GAZ-24-10 and GAZ-24-11, the GAZ-66-11 truck as well as (jointly with the Saransk Dump Truck Works and

the Kirgizavtomash PO [Production Association]) the GAZ-SAZ-3507 agricultural dump truck; at VAZ it is the new VAZ-2108 small class of front wheel drive vehicle; at KamAZ [Kama Motor Vehicle Works] it is the KamAZ-5410 tractor for dump truck trains hauling loose fertilizers and the KamAZ-54112 for use with the OdAZ-9385 semitrailer, a product of the Krasnoyarsk Motor Vehicle Trailer Plant, as well as the KamAZ-55102, with bilateral dumping (carrying capacity 7 tons), designed for operation as part of an agricultural truck train with a carrying capacity of 14 tons; at ZIL [Moscow Motor Vehicle Works imeni Likhachev] it is vehicles that operate on liquefied gas; at the Kutaisi Motor Vehicle Works it is the KAZ-4540 diesel agricultural dump truck for operation as part of a truck train with a carrying capacity of 11 tons (with the GKB-8535 dump truck trailer); at the Mytishchi Machine Building Plant it is ZIL-4948 motor vehicle chassis for operation with a feed distributor-mixer; at the Urals Motor Vehicle Works it is Ural-5557 dump trucks with diesel, designed for operation in agricultural truck trains with a 14-ton carrying capacity. The plant-manufacturers of trailers, semitrailers and specialized motor vehicles are also obliged to put out their products in excess of the established state plan; the Voroshilovgrad Motor Vehicle Assembly Plant imeni 60th Anniversary of Soviet Ukraine (dump truck semitrailers for KamAZ-5410 vehicles), Irbit Trailer Plant (the same kind of semitrailers), the Kozelsk Mechanical Plant (van models 5702 and 5703 for transporting birds and eggs), the Krasnoyarsk Motor Vehicle Trailer Plant (OdAZ-9385 semitrailers, with 20-ton capacity, for KamAZ-54112 tractors, dump truck trailers, with 7-ton capacity, for Ural-5557 tractors and refrigerated semitrailers with 11.5- and 22-ton capacities for KamAZ and MAZ [Minsk Motor Vehicle Works] tractors), the Neftekamsk Dump Truck Plant (semitrailer cisterns for vehicles and tractors to transport liquid complex fertilizers), and the Tiraspol Motor Vehicle Trailer Plant (11.5-ton refrigerated semitrailers).

It is clear that the early fulfillment of the enumerated socialist obligations is impossible without the corresponding help of allied supply enterprises, suppliers of materials and component products, etc. Therefore, before these obligations were adopted the enterprises agreed on them accordingly.

In 1985 branch enterprises are not only to increase the output of lot-produced equipment, but also to organize production of completely new models of vehicles, which includes a guarantee of producing test lots of them (prototypes) as well as the first industrial lots.

Thus, the following are obliged to produce experimental lots or prototypes of new vehicles: the Gorkiy Motor Vehicle Works and the Saransk Dump Truck Works--the GAZ-4301 diesel tractor, with 4.5-ton capacity, and a dump truck trailer for operation as part of a 9-ton capacity truck train, KamAZ--a dual-axle truck with reduced metal content and fuel consumption and increased life; the Kremenchug Motor Vehicle Works imeni 60th Anniversary of Soviet Ukraine--the KrAZ-6437 timber-hauling tractor with a dual-axle pole trailer; the Likino Bus Works--the diesel city bus LiAZ-5256; the Minsk Motor Vehicle Works--a timber-hauling tractor (22-ton capacity) with a dual-axle pole trailer; the Moscow Motor Vehicle Works imeni I.A. Likhachev--the ZIL-4331 diesel tractor, with 6-ton capacity, for operation in 12-14-ton capacity truck trains, as well as a truck that operates on liquefied natural gas; the Mytishchi Machine Building Plant--a subway car (series I) equipped with an automated control system and improved electrical and brake equipment; the Pavlovo Bus Works imeni A.A. Zhdanov--the PAZ-3205 bus for local service.



Also at a number of plants production of the first industrial lots of new vehicles will be prepared and carried through. For example, the Lvov Bus Works will put out a batch of LAZ-42021 diesel suburban buses (80-passenger capacity); the Mogilev Motor Vehicle Works imeni S.M. Kirov--the MoAZ-7503 earth mover with a 45-ton capacity; the Minsk plant--the 8-ton capacity MAZ-5551 dump truck; the Mytishchi Machine Building Plant--the motor vehicle self-loader model 4952 (on the ZIL-130B2 chassis) for the transport of ferrous metals; the Neftekamsk Dump Truck Works--the model 9674 semitrailer cistern for transporting petroleum products; the Tiraspol Motor Vehicle Trailer Plant--the OdAZ-9786 refrigerated semitrailer with 22-ton capacity (for the MAZ-6422 tractor); the Rzhev Tractor Electrical Equipment Plant--a fluid heater-preheater (productivity of 8 and 20 kilocalories per hour) for buses and trucks, etc. Preparation will be concluded for the production (Minsk Motor Vehicle Works) of a family of new vehicles, MAZ-5432 and MAZ-6422. Bearing plants will organize lot production of 290 new standard sizes of roller bearings.

All this equipment will start a powerful flow into the national economy in the upcoming 12th Five-Year Plan. It is progressive by intent; all the most modern achievements in science and design are reflected in it. It requires, obviously, equally modern technology. Therefore, in the socialist obligations adopted for 1985 a correspondingly large place is occupied by obligations linked to the institution of new technology and equipment as well as to automation and mechanization of production processes. All of the branch's enterprises and scientific-research and design-technology organizations will be involved in this work. Its result will be an increase (to 36 percent of the total volume) in castings of greater precision; in castings of high-strength cast iron--to 172,000 tons; in hot stamping of increased precision--to 660,000 tons and in extrusion-method stamping--to 120,000 tons; parts obtained by plastic deformation methods--to 20,000 tons per year. The socialist obligations also stipulate the early commissioning of 250 automatic and flow-mechanized lines, 510 machine tools with ChPU, 550 automatic manipulators with programmed control, 62 units of equipment supplied with command controllers, 5 flexible automated production systems and 9 automated systems for controlling technological processes. On the basis of microprocessor equipment, five sections each will be set up and put into production in tool and lot production. All this allows a reduction of not less than 9,500 working places.

These same ends are also served by the overfulfillment (projected in the socialist obligations) of the plans for the production of special technological equipment (by 3 percent) and the manufacture of not less than 1,500 robots. In particular, the VAZ collective adopted a resolution to produce the first industrial lots of automated (with programmed control) manipulators, with a carrying capacity of 60 kilograms, designed for resistance spot welding and, besides that, of the MP-11 two-armed automatic manipulator, a modular design with pneumatic drive and programmed control (the manipulator's carrying capacity is 1 kilogram).

The branch's scientific-research, design-technological, planning and construction organizations also took on serious obligations. For example, it is projected that they complete scientific-research and experimental-design operations for 1985 ahead of schedule, increase the scientific level, efficiency and quality of these operations and accelerate the integration of new types of effective equipment, tools, materials and advanced technological processes. The design

organizations, having evaluated their reserves, resolved to fulfill the annual plan for output of design plans and specifications on 27 December and to turn over complete production forms for 1986 construction objectives to the builders no later than 1 July 1985. The builders in turn obliged themselves to put new production capabilities into operation in 1985 on the production of 17,000 trucks, 5,100 passenger cars, 100 buses, 23,800 trailers and semitrailers, 22,000 engines, 24.7 million bearings, 1,500 automatic loaders, 7,000 motorcycles, 25,000 bicycles and 71.2 million rubles worth of spare parts for motor vehicle equipment.

In recent years many criticisms have been addressed to the enterprises involved in servicing motor vehicles. Their collectives, as well as the collectives of many other enterprises have drawn the correct conclusions from this and are undertaking a number of measures directed toward sharply increasing the quality and effectiveness of operation. For example, in order to bring the technical availability factor of KamAZ vehicles up to at least 0.85, the obligation was undertaken to increase spare parts production by 20 percent and to set up a network of regional support points of allied supply plants for KamAZ; in order better to satisfy the demands of passenger car owners, it was resolved to sell, through the trade network, one million rubles worth of spare parts and accessories in excess of the plan, to increase the volume of services and products by 12 percent and to commission 60 STO [service stations] with 240 work stations. In the motor vehicle service system, just as at the branch's plants, progressive forms and methods of labor organization will be developed; a branch-wide obligation was adopted to bring the number of brigades that are paid according to the end result up to 80 percent of the total number of workers and to increase the number of self-supporting brigades by 15 percent. An experiment will be conducted on the further improvement of brigade forms of labor organization and compensation and directed toward replacing temporary workers with permanent ones and strengthening the cadres. In order to fulfill these high and strenuous obligations, every enterprise and shop, every brigade, every individual worker must work at full efficiency, find and skillfully utilize internal production reserves, be an economical and zealous manager and deal creatively with the business entrusted to him. A fairly large amount of experience in such operation has been accumulated in recent years, especially in 1984. It says that labor collectives have learned to evaluate their opportunities correctly, to solve the problems that arise creatively and not only to fulfill, but to overfulfill the socialist obligations that they take on. Therefore, one need not doubt; the obligations for 1985 will also be fulfilled completely. The more so, since 1985 is special--it concludes the five-year plan that has been called the five-year plan of efficiency and quality and is the year of preparation for the 27th CPSU Congress, the 40th anniversary of the victory of the Soviet people in the Great Fatherland War and the 50th anniversary of the Stakhanov movement. All this inspires the workers of the motor vehicle industry to new labor achievements, strengthens their resolve to achieve new successes in carrying out the resolutions of the 26th Party Congress and subsequent plenums of the CPSU Central Committee and to secure fuller use of the production and scientific-technical potential of the branch and the further intensification and increased efficiency of production.

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## MOTOR VEHICLES AND HIGHWAYS

### DEPUTY MINISTER ON MOTOR VEHICLE FUELS, LUBRICANTS PROBLEMS

Moscow ZA RULEM in Russian No 3, Mar 85 pp 1-2

[Article by L. Bychkov, deputy minister, USSR Ministry of the Petroleum Refining and Petrochemical Industry: "Fuel, Oils, and the Automobile"]

[Text] The fuel-energy complex... Fuel-energy problems... I daresay that one could not find many such word combinations in our times which are so oft-repeated, and which are of such interest to so broad a sector of society. There are many reasons for this. These include the development of the complex itself, and expansion of its geographical zone; the spread of motor vehicles and cars, which has given rise to growth in the demand for fuels, oils and other service materials; the limited nature of petroleum natural resources, which we began to take seriously only ten or so years ago; and, finally, the shifting of the oil extraction zones ever further north and east, which has made extraction conditions more complex and transportation more costly. In the final analysis, all the various factors of these complications affect the consumer of petroleum products in one way or another. But we, the workers in the petroleum refining sector, are the first to feel their effects.

If one looks into the past, one could say without the slightest exaggeration that the Republic of the Soviets inherited so little from the old regime in terms of petroleum refining enterprises, and that these little plants were run with such primitive technology, that they could in no way become the basis for the country's fuel-energy base. And in the first days of Soviet power, the party and the government set the task to establish a domestic petroleum refining industry. This task has been fulfilled. And today we can speak of an entire sector, equipped with modern technology, which possesses skilled cadres, which is continually developing. In addition to the well-known petroleum refining enterprises such as Omsk, Baku, Moscow, and Groznyy, in just the last few years new combines have been added in Mozyr', Mazheykyay, Pavlodar, Lisichansk, and Achinsk; and technical reorganization is continuing at the major plants along the Volga and in the Ukraine. Yes, even the old plants are being rejuvenated and are expanding; and new, powerful installations are being built there to produce high-quality petroleum products.

The basic type production of the petroleum refining industry is the complex of fuels and lubricating materials necessary for transportation: diesel fuels and automobile gasolines, all kinds of oils and plastic lubricants. At the same time motor transport and the automobile industry quite often decisively influence enterprise specialization in our branch. For example, for the needs of the Volga Motor Vehicle Works [VAZ], we produce nearly 150 kinds of industrial lubricants, which in the overwhelming majority of cases meet or exceed world standards of quality. They provide for efficient utilization of machine tools, equipment and instruments, increase their term of service, provide for rational consumption of raw materials, and increase labor productivity and production quality.

The assortment of oils and lubricants used in the vehicles themselves is not so great--there is no need for it. For carburetor-equipped trucks and passenger cars (except for Zhiguli's), our plants have until recently produced M8B<sub>1</sub> and M9A motor oils, which should be changed every 4-8 thousand kms. Now production of these oils has been discontinued and they have been replaced altogether by the new M8V<sub>1</sub> variety, which is distinguished by its greater resistance to acidity, and more stable additives. As thorough tests have indicated, the new oil can be used in engines three times as long--its service life can be up to 8-12 thousand kms. However, we note with regret that these qualities are not yet being utilized, since the instructions issued by the manufacturing plant continue to cite the old recommendations, and the people operating the vehicles are draining off what is in essence fresh oil, which is suitable for much more use. And it is understandable that this creates difficulties with planning and deliveries, and in the final analysis gives rise to complaints for a shortage of oil. For automobile engines in the "Zhiguli" line we are producing oils in group G<sub>1</sub>, and among these, the most widely distributed is the all-season M6<sub>3</sub>10G<sub>1</sub>. High-compression diesels with turbochargers, produced at BelAZ's [Belorussian Motor Vehicle Works] require the special M10DM and M8DM oils, and are receiving them in sufficient quantities.

Motor transport which operates under very low temperature conditions requires special oils. The oil problem here involves a wide range of questions, including ease of starting, and the durability and reliability of the motors. We have the pleasure of reporting that an entire group of "northern" oils has been developed: the M-4<sub>3</sub>8G<sub>2</sub>, M-4<sub>3</sub>6G<sub>2</sub> and the M-4<sub>3</sub>8D; these are designed for engines with varying degrees of compression. They are currently undergoing final tests and will soon appear in operation.

Quite often motorists have every right to complain about the lack of oils for sale, such as the M-6<sub>3</sub>/10G<sub>1</sub> motor oil. This comes about because of the fact that the production plan is formulated for the most part on the basis of the needs of VAZ automobiles. But this oil has become much more widely used. In order to eliminate the shortage, measures are being taken to expand production volume. During the next five-year plan, processing of this oil will increase by a factor of 1.5. There will also be considerable expansion in the production of a summer oil in this group-- the M-12G<sub>1</sub>, which will permit significantly improving operating conditions for high-compression engines in passenger cars during the hot periods.

A rather difficult situation has come to pass with TAd-17I transmission oil as well. It is hard to buy, and they don't always have it at the service stations. And why! Production volume for the oil was determined on the basis of the number of operating passenger cars, but it is being used in a wide variety of machinery and industrial equipment, where it is completely unnecessary. Of course we will increase production volume, but it is also time to establish some order in the use of this hard-to-find oil as well.

Until last year difficulties had arisen in various parts of the country with M-8V, motor oil, which possesses high operating qualities. USSR Minneftekhimprom [Ministry of the Petroleum Refining and Petrochemical Industry] has taken measures--has stopped production of M-8B,U oil beginning with 1984, and has increased the production of M-8V oil to a volume sufficient for servicing the motor vehicle fleet. We note that the domestic MGT oil, which is used in hydro-mechanical transmission boxes excels, in its viscosity and temperature qualities, all known kinds for automatic transmissions.

It is well-known that oil quality today in the final analysis is defined in terms of the quality and the composition of its additives. Therefore, we pay the strictest attention to production of various kinds of additives. Presently we are producing almost a complete assortment, which assures the oil quality required; moreover, production volume is growing steadily. In the last three years alone, additive production capacity has increased by 17,000 tons.

At the same time we consider all-round standardization and unification a necessity. For this reason, a single transmission oil has been developed and introduced for large-capacity vehicles--TSp-15K; and for passenger cars, TAd-17I. The very same considerations dictated the passing of GOST decision [All-Union State Standard] 305-82 for diesel fuel, in accordance with which instead of the eight kinds which had been produced previously, only three remain in production: summer, winter and northern.

Production of fuel is a special and very serious question. Naturally it is not possible to illuminate all aspects in a short article. But we must tell about the increased volume and improved quality of certain of them.

In 1983, 48.9 per cent of all diesel fuel was produced with the Mark of Quality. Production of A-66 gasoline was completely halted, and production of gasolines with octane ratings of 76 and higher increased by 34 per cent in comparison with 1975. Active measures are being taken to reduce the amount of materials used in production, and to ensure more complete utilization of raw materials. Waste-free production processes are being assimilated. Secondary hydrocarbon resources are being brought into the sphere of production.

However, while increasing product output and raising the quality, we cannot ignore questions of its careful and economic use.

CPSU Central Committee General Secretary, Chairman of the Presidium of the USSR Supreme Soviet, Comrade K.U. Chernenko, in his speech during the meeting with the workers of the Moscow "Serp i Molot" [Hammer and Sickle]

Metallurgical Plant, called attention to the fact that reserves of coal, ore, oil and gas are not renewable and they must be utilized rationally in order to save them for future generations. These words apply to those who extract all of this and to those who consume it as well.

Oil extraction is becoming an ever-more difficult problem, which requires continuously new capital investments. For example, just in recent times capital investment expenditures per ton of oil in the Tyumen' Oil Fields have grown by more than 30 per cent. In this connection we would like to call attention to how domestic automobile engines meet today's needs. The fact of the matter is that they use too much fuel and oil. And what improving the design can achieve is well illustrated by the example of the new "2108" model, which was created at the VAZ. This vehicle has many advantages. Its engine is more economical and is lighter. It is equipped with an electronic ignition system. A five-speed transmission permits more rational use of engine power. The VAZ-2108 is almost 100 kg lighter than the "2105". And the vehicle will be equipped with an economy meter--an instrument which informs the driver whether he has chosen the proper gear and operating condition for the motor, and warns him of excessive fuel expenditure. This design decision permitted a 15 per cent reduction in gasoline consumption, as compared with present models.

We have cited these data in order to stress once again: the solution to fuel-energy problems depends not only on the oil extractors; and not only on us, the refiners; but to a significant degree it also depends on those who create the machinery which requires fuel and oil. Our automobiles must become lighter. And they should become more streamlined. Automatic transmissions should be more widely used. These are reliable methods for reducing fuel consumption, proven in practice the world over.

Dieselization of the motor vehicle fleet is proceeding slowly, in our view. With our present situation with fuel resources, it is time to speak of wide use of various kinds of fuel for passenger cars, and primarily diesel and gas. Presently even for truck production, about one-fourth of the vehicles coming off the conveyer line are equipped with diesels.

The question of optimization of the octane rating of gasoline is directly connected with the discussion on the technical level of making automobiles. The fact that increasing the compression ratio and using higher-quality fuel will permit reducing the amount of metal in the engines and will increase the correlation between their power and fuel consumption is beyond doubt. However, we would like to call attention to the situation, that at the present level of designing and manufacturing, fuel with a lower octane rating may be used for the existing engines. Experience in operating Lada and Zhiguli automobiles in the CEMA member nations shows that it is possible to use gasolines with octane ratings of 90-91 and even lower. For example, the Hungarian firm "Volan" operates Lada automobiles as taxis on 86 octane gasoline. At the same time, they run three shifts, and operate up to 300,000 km without major repairs. And reducing the octane rating of AI-93 gasoline from 93 to 90 would permit increasing fuel production by 1.5 to 2.0 per cent without increasing the volume of petroleum refined. Optimization of

gasoline octane ratings also becomes more significant in connection with environmental protection measures, since it permits reducing the lead antiknock content and, consequently, reducing the toxicity of the exhaust gases.

We are also disturbed by the situation, that the use of high-quality fuels at times does not provide the kind of results one has a right to expect. For example, the "Volga" GAZ-24 automobiles have engines with various modifications, which operate on gasolines A-76 and AI-93. According to all the scientific data, fuel consumption for the second engine should be lower than for the first. But in practice, the lineal norm of consumption is the same in both cases--13 liters/100 km. There is no difference in consumption but there is a difference in raw material consumption, and in the cost!

Fulfilling the decisions of the 26th CPSU Congress on strengthening the country's fuel-energy base, creating more effective fuels and attendant materials, and increasing the economy of petroleum products depends on the collective efforts of the workers of many branches of the national economy. The workers in the petroleum refining industry will do everything for which they are responsible in solving this important task.

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## MOTOR VEHICLES AND HIGHWAYS

### 1927-1984 AUTOMOBILE PRODUCTION FIGURES

Moscow ZA RULEM in Russian No 3, Mar 85 p 6

[Article by Ye. Ustinov: "20 Million"]

[Excerpts] Soviet automobile manufacturing grew from year to year, and in November 1958, through the efforts of three of our plants (GAZ [Gorkiy Motor Vehicle Works], ZIS [Moscow Motor Vehicle Works imeni Stalin] and MZMA [Moscow Small-Displacement Motor Vehicle Works]), the one-millionth mark was reached. But passenger car production achieved its true scope in the period 1970-1975. In 1971, more than a million vehicles came off the assembly lines--five times more than in 1965. Sales to the public for personal use grew accordingly. Such significant growth became possible primarily as the result of the opening of the gigantic Volga Motor Vehicle Works in Togliatti, with its designed capacity of 660,000 vehicles per year. Over a 15-year period, more than 8 million Zhiguli's and Niva's have rolled off its assembly lines.

A significant contribution to expanded production of passenger cars was made by the reconstructed Moscow Motor Vehicle Works imeni Lenin Komsomol and by the new works in Izhevsk (now the city of Ustinov). In August 1980, the three millionth Moskvich was assembled, and four years later, the two millionth Udmurt [ASSR (Izhevsk)] automobile.

At the present time, eight modern automobile works in Togliatti, Moscow (two), Ustinov, Zaporozhye, Gorkiy, Ulyanovsk and Lutsk annually manufacture nearly 1.3 million passenger cars.

In just four years of the 11th Five-Year Plan, Soviet industry has produced more than 5 million passenger cars. At this rate, by the middle of March the 20 million mark will be reached. And by adding up the Zhiguli's and the Niva's, the Moskvich's and the IZh's [Izhevsk Motor Vehicle Works], the Zaporozhye's and the LuAZ's [Lutsk Motor Vehicle Works], the ZIS's, the ZIL's [Moscow Motor Vehicle Works imeni Likhachev] and the UAZ's [Ulyanovsk Motor Vehicle Works], we arrive at the figure 20,000,000. A half-century ago this achievement would have been considered impossible. Today we mark it almost in passing--simply as another milestone in domestic automobile manufacturing.

# Production of Passenger Cars in the USSR

Years	Number of Vehicles	Years	Number of Vehicles
1927	3	1956	97,792
1928	50	1957	113,588
1929	156	1958	122,191
1930	160	1959	124,519
1931	---	1960	138,822
1932	34	1961	148,915
1933	10,259	1962	165,945
1934	17,110	1963	173,122
1935	18,969	1964	185,159
1936	3,679	1965	201,175
1937	18,250	1966	230,251
1938	26,986	1967	251,441
1939	19,647	1968	280,332
1940	5,511	1969	293,558
1941	3,980	1970	344,248
1942	2,567	1971	529,041
1943	2,546	1972	730,105
1944	5,382	1973	916,700
1945	4,995	1974	1,119,422
1946	6,289	1975	1,201,210
1947	9,622	1976	1,239,000
1948	20,175	1977	1,280,000
1949	45,661	1978	1,312,000
1950	64,554	1979	1,314,000
1951	53,646	1980	1,327,000
1952	59,663	1981	1,324,000
1953	77,380	1982	1,307,000
1954	94,726	1983	1,315,000
1955	107,806	1984	1,300,000

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## MOTOR VEHICLES AND HIGHWAYS

### MOTOR VEHICLE INDUSTRY RESISTS NEW AVIATION TECHNOLOGY

Moscow SOVETSKAYA ROSSIYA in Russian 25 Feb 85 p 2

[Article by O. Kaybyshev, department head of the Ufa Aviation Institute, doctor of technical sciences and professor: "Easier to Invent..."]

[Text] About two years ago the author of these lines met with directors of the Ministry of the Motor Vehicle Industry. "Do you want to save 1600 tons of brass a year?", I asked. "It's tempting! And what do we have to do for this?", inquired the comrades. "Not much--change the method of processing one part, the synchronizer ring on the KamAZ vehicle; instead of mechanical processing use stamping in conditions of superplasticity." "Let's develop the technology without delay!", the ministry directors jumped at the idea.

In order not to propose a "pig in a poke", we decided to demonstrate the advantages of the new technology. The scientific subdivision of the Ufa Aviation Institute designed a die and manufactured a batch of parts. They passed all the tests. The economic effect was calculated; in reduced materials consumption alone it comprised more than two million rubles and allowed a savings of half the railroad supply of critical non-ferrous metal per year... It seemed that the vehicle engineers were satisfied.

Before continuing the story, we will explain to the reader just what superplasticity is. It is the property of alloys to deform even under insignificant exposure and to acquire any configuration without breaking down. These properties can be imparted to practically all industrial alloys, including the deformation-resistant and low-plasticity ones.

Superplasticity promises huge profit for the national economy. The manufacture of parts by hot stamping, almost without mechanical processing, reduces metal consumption two- or three-fold. Labor input is reduced many times over, as are the need for cutting instruments and machine tools, electrical energy and working areas. The service life and reliability of the metal are lengthened, as processing under conditions of superplasticity imparts great strength to it and improves its properties.

It is notable that it is possible to stamp parts of the most various sizes and configurations. It is unlikely, but it is a fact; in our laboratory a press with a force of 1600 tons forms, from superplastic material, the kind of goods that



with the usual technology would require a giant press with a force of 30,000 tons, a unique structure.

Specialists do not need a good imagination to conceive the potential opened up by the new technology, especially in combination with robotization. Relatively slow rates of deformation allow the technological processes to be easily mechanized and automated. It is already clear now that the technology based on the effect of superplasticity could become a basic one for the establishment of flexible automated production.

In our country work in the field of superplasticity is being conducted most intensively at the Ufa Aviation Institute and the Moscow Institute of Steel and Alloys. The USSR State Committee on Science and Technology entrusted to these vuzes the development of a complex program for the study and introduction into industry of the superplasticity effect for the 12th Five-Year Plan. The high level of the work of UAI [Ufa Aviation Institute] scientists is confirmed by the large number of patents on inventions, scientific works, publications in foreign special periodicals and presentations at international conferences and symposia. A number of our inventions are patented in leading capitalist countries.

Today the enterprises of many ministries are assimilating technology developed by our research laboratory. And all the same, there is no satisfaction of practical return from these developments. The extent of application should and could be more significant.

When you wonder why the long-term trend finds few of its adherents among the commanders of industry, from the plant director to the minister, you have to return to the old topic of flaws in the process of introduction.

We will return to the conversation at Minavtoprom, described at the beginning of the article. The interest displayed by the branch management in the progressive method on first acquaintance turned out to be only lip service. The business went no further than the calculation of economic effect. In this example, as in a drop of water, the problem of introduction is reflected.

The true motives for the branch management's and KamAZ [Kama Motor Vehicle Works] directors' rejection of the innovation, toward which the minister himself at first displayed genuine interest, are no secret. Although the advantages of the new method are obvious, organizing it will entail new capital investments and a great deal of trouble. It will require that an established process be changed and practically a whole line of machine tools, bought, by the way, with hard currency, be thrown out. For all I know the plan may suffer. Is one part worth all that fuss? Granted, Gosplan so far does not deny the motor vehicle industry those 1600 tons of brass that KamAZ presently turns into shavings. At the ministry they decided just to forward the problem for the conclusion of the chief branch NII [Scientific Research Institute]...

From there everything goes according to a familiar scenario. The NII is "its own", it knows what is wanted of it. And it is not in its interests for its "diocese" to be invaded. As one would expect, it answers "no". The rejection is motivated by the fact that the institute is aware of a better process than that proposed by the UAI scientists. In the end, neither the proposed nor the "better" version,

apparently known only to the branch NII, is instituted. And the plant continues to take hundreds of tons of shavings off of ingots of a valuable metal...

One would think that criticism of the shortcomings of the existing system of integration and specific suggestions for increasing its effectiveness have been sufficiently and convincingly expressed at scientific and business meetings. It should be time to weigh, evaluate, summarize.

The system of measures worked out should not be complicated. It should be based not on administrative principles, but on economic ones. This type of scheme could be proposed. After approving an innovation, GKNT [State Committee on Science and Technology] and Gosplan work out an entire program for integration, having correspondingly reduced the enterprise's quota for materials consumption and at the same time given it economic incentive. The stimuli developed in the resolution of the CPSU Central Committee and USSR Council of Ministers "Measures for Accelerating Scientific-Technical Progress in the National Economy" could play a role here.

The authors of scientific developments today often find themselves in the unenviable role of "messengers" with degrees, pushers of their ideas before the directors and specialists of enterprises and the workers of ministries. We cannot put up with such a situation. The author should not go begging to the executive, but to some intermediate organization within GKNT, which would be endowed with the authority to make known the most efficient innovations and control their integration. The work of this organization should be evaluated according to the ultimate economic effect of those developments that are realized.

Almost all the authors appearing in print on the given topic stress the necessity of strengthening the experimental base so that scientific developments are carried to the level where they can be taken by industry and integrated without revision. Although the importance of a solution to this problem is not in any doubt, there is so far no system of planned measures for strengthening the experimental base of scientific establishments.

I wholly subscribe to the idea of M. Bashin, member of the scientific council of the AN SSSR [USSR Academy of Sciences], in the article "The Strategy of Integration" (SOVETSKAYA ROSSIYA, 18 September 1984), which alluded to the example of the UkSSR Academy of Sciences Institute of Electric Welding, headed by academic B. Ye. Paton. The institute's success in integrating scientific developments is connected in the first place with the presence of a powerful experimental base. As a result, the institute delivers ready technology and is famous for its contribution to scientific-technical progress. It appears that this experience should be disseminated everywhere.

Let's return to the superplasticity method. Our vuz department, which is working on this topic, outgrew the areas and sign first allotted to it. Thanks to the persistent support of the party oblast committee and the RSFSR Minvuz [Ministry of Higher and Secondary Specialized Education] in Ufa, construction has begun on scientific and industrial compounds. Thus, we will have a solid experimental base, and with it operational, the integration of new technology, have no doubt, will begin to go faster.

Nevertheless, when you call to mind all the peripeteia of the path that science has traversed in the superplasticity of metal, you cannot help but regret the missed opportunities and lost time in the endless, indecisive, tiring "pushing through". It goes without saying that I am talking not only about us. The main thing is that similar examples not be repeated in the future. The problem should be solved on a state scale of the development of effective strategies and tactics for integration.

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MOTOR VEHICLES AND HIGHWAYS

NEW FMS LINE OPERATIONAL AT AZLK WORKS IN MOSCOW

Moscow STROITEL'NAYA GAZETA in Russian 25 Jan 85 p 1

[Article by N. Pozhidayeva under heading "Placed in Operation": "Under the Control of Automation"]

[Text] Moscow--The first automated flexible manufacturing line has gone into operation at a new press facility at the Moscow Motor Vehicle Works imeni Lenin Komsomol [AZLK]. It will radically change the body manufacturing process for Moskvich cars. Construction is being carried out by units of the Glavmospromstroy Moscow Industrial Construction Organization and the USSR Ministry of Installation and Special Construction Work.

The presses in the high-ceilinged, brightly-lit shop operate almost noiselessly. A smooth steel sheet is fed into the first press. Seven operations are performed in just a few minutes, and before us is a finished car hood.

For comparison, the old line had a production capacity of only 1,500 parts, and it was manned by 12 workers. The new line will produce 5,000 parts per shift, and it is controlled by only one operator.

"Automation guarantees excellent quality and completely precludes rejects," says V. Gribov, superintendent of the new press facility.

Another significant feature is that the new lines are flexible, and each can be readjusted for the manufacture of six different parts.

The manufacturing sequence is programmed in a computer and the operator at the central panel doesn't even have to press any buttons. He intervenes only in extraordinary cases, for example, breakdowns.

All the automated control systems of the press facility were supplied by enterprises of the German Democratic Republic and installed by specialists of the Moscow administration of the Tsentrromontavtomatika automation installation organization.

"This is a new generation of automation," says the superintendent of the assembly section, Igor Semenovich Shapiro, USSR Council of Ministers Prize winner. "Our workers encountered quite a few difficulties during assembly.

Specialists of the Erfurt firm employ a computerized address method of designing. Instead of conventional detailed drawings we received laconic diagrams, which only very high-class specialists are capable of deciphering."

Igor Semenovitch introduced the team of S. Lyubashin, the first in the association to win the title of Communist Work Team. Its members are well-known at AZLK, and the German assembly supervisors note the high quality of assembly work.

"Virtually all team members are engineers in worker coveralls," says the section superintendent. "The high standards of professional training has enabled them to quickly master the new type of work and grasp the minutest details in the design of each type of instrument."

At present assembly of the control system for the second line is nearing completion. The expansion of AZLK continues. The all-union Komsomol construction project is acquiring momentum.

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## MOTOR VEHICLES AND HIGHWAYS

### TIRE SHORTAGES DUE TO POOR PERFORMANCE OF RETREADING PROGRAM

Moscow IZVESTIYA in Russian 1 Mar 85 p 2

[Article by G. Bystrov, section chief of the USSR Committee of People's Control, and correspondent A. Frolov: "Automobile 'Shoes': Why the Shortage?"]

[Text] Neither an automobile, a tractor, nor an airliner can budge without tires. But tires eventually wear down. However, a tire which has run out its lifetime can run some more if it is "treated." For that there are special enterprises.

Within the Ministry of the Petroleum Refining and Petrochemical Industry there is an all-union industrial association for producing reclaimed rubber and retreading tires. Retooling and equipment repairs have been carried out at several plants. In some regions of the country where there are many automobiles and farm machines, commercial tire receiving, retreading and exchange centers have been set up. Last year this made it possible to increase tire retreading 11 percent over the 1982 level.

Nevertheless, retreading plans are not being fulfilled. Over a period of three years they fell short by 660,000 tires. Small wonder that when one comes to an enterprise or collective farm and asks why automobiles are standing idle the reply often is, "No tires..."

Indeed, there is a shortage of tires. Last year some 100,000 vehicles were idle for that reason. Private car owners had serious difficulties trying to get tires.

Did enterprises of the ministry have the capabilities to fulfill their assignments? Yes, they did. With fuller utilization of production capacities they could even have overfulfilled them. But it turns out that capacities for retreading large tires were utilized on average only 53 per cent, and those for truck tires 81 percent. However, the Ministry of the Petroleum Refining and Petrochemical Industry and its Soyuzremshina [tire retreading] All-Union Production Association failed to duly organize work to increase the output of retreaded tires. Characteristic of all poorly operating plants are low production standards and extensive unforeseen equipment downtime, bred in turn by poor servicing and low quality maintenance.

Inspections have established that the plans of many plants were below their capabilities, yet even they frequently remained unfulfilled. Every fourth enterprise failed to meet its quotas.

The list of worst enterprises is headed by the Kishenev Retreading Plant (director Comrade Mikhaylov). Last year it fulfilled the annual retreading quota by 49.7 percent. Why? The equipment is in shabby state. Maintenance schedules are not met. As a consequence, each day 10 to 16 vulcanizing presses, more than one-third of the total, were idle. Two new retreading machines, as well as most instruments, are out of order.

Tire vulcanization procedures are violated. Primary rejects amount to almost seven percent of all retreaded tires.

Second among the lagging enterprises is the Leningrad Krasnyy Treugol'nik Production Association (general director Comrade Runov). Retreading capacities are only 75 percent utilized. The reason is the same; unsatisfactory equipment maintenance. Hence unforeseen repairs and downtime. As a consequence, last year consumers failed to receive more than 22,000 tires.

The considerable losses at the Krasnyy Treugol'nik are due to absenteeism and shortage of skilled workers. Shortcomings in the organization of production have led to greater personnel turnover, which increased 1.5-fold over the last two years. Technological discipline is in a poor state. As a consequence up to five percent of the tires have to be reworked, and about one percent are rejected.

Matters are no better at the Makharadze Retreading Plant (director Comrade Mikitadze). Violations of manufacturing procedures have become systemic. As a result losses due to spoilage are almost five times higher than the industrial average.

Serious shortcomings in the organization of tire retreading have also been found at the Kalinin, Buynaksk, Karaganda, and several other retreading plants.

And how do retreaded tires behave? Not so good. Tire run is still far below the norm. The run of tires retreaded by the Belogorsk, Krasnoyarsk and Khabarovsk plants is especially low.

The main reasons why plants fail to meet tire retreading quotas have been named. But there are other reasons as well. The ministry was to have placed seven new retreading facilities in operation, but only four have been commissioned. A shop still has not been built at the Volga Tire Retreading Plant, although it had been planned for 1983. Two years ago work was to have begun on a similar facility at the Nevinnomyssk plant, but even the ground there still remains unbroken.

Little concern is shown for retooling. In 1982-1984, it was planned to increase capacities for retreading 850,000 tires, but actually they were increased by only 470,000.

The time eventually comes when a tire is beyond repair. What is done with it then? At special plants it is processed into reclaimed rubber, rubber crumb, and other useful products. Reclaimed rubber is used as a substitute for expensive natural rubber, while rubber crumb is used for road surfacing.

However, the Ministry of the Petroleum Refining and Petrochemical Industry is also lagging in processing tires into reclaimed rubber and rubber crumb. It has not met its 1982-1984 quota of producing 471,300 tons of reclaimed rubber from worn tires, falling 100,000 tons short. Capacities for producing reclaimed rubber are on average utilized 84 percent, to say nothing of the fact that reclaimed rubber produced by many plants is of poor quality. In the course of 18 months, six inspected plants produced 37,000 tons of substandard reclaimed rubber.

The ministry has not organized other methods of processing worn tires, such as pyrolysis, which makes it possible to produce raw material for the manufacture of technical carbon and other products. In 1982-1985 it was planned to place seven installations in operation, but so far not one has been built. Construction of the first installation was moved up from 1982 to 1985, while for the other six installations the sites haven't even been determined.

Numerous shortcomings in tire retreading and in processing worn tires have been revealed. The Ministry of the Petroleum Refining and Petrochemical Industry and its collegium have the duty of closely analyzing the reasons for failing to fulfill assignments and speedily overcoming shortcomings. This is a matter not only of passing a good resolution but also of good, well thought-out organization of its implementation and rallying plant personnel for this.

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## MOTOR VEHICLES AND HIGHWAYS

### ZIU-684 B TROLLEYBUS WITH THYRISTOR-IMPULSE CONTROL

Moscow GUDOK in Russian 26 Feb 85 p 4

[Article by B. Kolesnikov: "Streetcar on Rubber"]

[Text] Engels--Moscow--The first fundamentally new model of "streetcar without rails" in domestic practice, the ZIU-684 B trolleybus with a thyristor-impulse control system, will be put on the conveyor at the M. S. Uritskiy Works, the largest trolleybus producer in the world.

Perhaps even the capital's old timers have forgotten what the first Soviet trolleybus was like, which little more than half a century ago began travelling along the main street of Moscow--Gorkiy Street--to the Belorusskiy Station. Today it is only in newsreel sequences that one can see the first of what was at that time a new type of electric city surface transport. Then the vehicle, cooperatively built at several Moscow plants, remotely resembled the modern one; its body was wooden, the passenger compartment was not heated and the doors were opened by hand. Today's trolleybus models are distinguished by increased comfort. But specialists believe that the technical possibilities for increasing their economy are far from completely utilized.

This small city on the Volga is pretty and agreeable at all times of year--Engels, the neighbor of the large industrial center Saratov. The M. S. Uritskiy Works traces its roots from an enterprise that was founded in the last century in the village of Bezhitso, Bryanskiy Province, where railway passenger carriages were produced. During the war the enterprise was evacuated to the Volga and on 1 May 1950 it produced the first trolleybus to run on batteries, the MTB-82, the predecessor of the trolleybus with the ZIU emblem, now well known in many countries of the world. In the past year alone 2300 elegant vehicles have come off the plant's conveyor--the greatest number in the entire history of the development of the branch.

"And what will the trolleybus be like tomorrow?"--I addressed this question to G. Zavodnov, chief engineer of the USSR Ministry of Motor Vehicle Industry VPO [expansion unknown] Soyuzavtobusprom.

"Still more comfortable, and what is especially important, more economical," answered Gennadiy Afanas'yevich. "The trolleybus has long been one of the most popular and mass types of transport in the country's large cities. Today millions

of residents use its services. In Moscow alone there are 80 trolleybus routes with a total length of more than 2000 kilometers--a distance equal to that between the capital and Vorkuta. The Moscow trolleybuses carry more than two million passengers daily.

It is also not unimportant that the trolleybus is absolutely clean transport ecologically, is practically noiseless and does not require large capital expenditures like, for example, laying track and setting up track facilities in a depot. Metal is consumed only in laying out the contact system, and outdoor lighting poles are generally used for supports. A trolleybus costs 6-8 percent less than a bus. The basic problem that the new model, with the thyristor-impulse control system, helps to solve is that of reducing the consumption of electrical energy in the operation of the vehicle.

This system not only improves the running qualities of the model, providing smoother motion, greater maneuverability and fast smooth acceleration, but also provides a substantial economic effect--it reduces electrical energy consumption by 20-25 percent.

Now imagine that you and I are passengers on the experimental trolleybus ZIU-684 B, which, with the "Testing" placard in the windshield, has gone out beyond the gates of the plant onto the streets of the city of Engels. Walking into the passenger compartment we immediately notice that it is much more spacious, although its dimensions are as before. This has been achieved thanks to a more rational internal arrangement. For example, smaller scale seats than before permitted the aisles to be widened, having freed space at the door platforms. And more about the seats: they have been made at the level of modern international standards--safe, with cushions on the backs. It is pleasant to make even a long-distance trip in such a comfortable seat, for example, on a "city--suburb" route. We will add to this the fact that the vehicle holds 130 passengers and is equipped with a more powerful engine that has enough power to get over even steep inclines easily at a speed of 60 kilometers per hour.

And, finally, about the construction of the body itself--it is produced with improved rust protection. This is a significant plus for operation of the model in republics with hot and humid climates and in maritime areas. Other innovations have also been incorporated in the design; the floor in the passenger compartment is level, without an inclined platform by the rear doors, the form of the rod and current collectors has been changed and the doors utilize a new pneumatic-electric device.

And nevertheless, the ZIU-684 B is a transitional model if one looks at the extended perspective of trolleybus manufacturing. The base of the future ZIU will be the body of the new LiAZ-5256 bus, which was demonstrated at the USSR VDNKh [Exhibit of National Economic Achievements] at an exhibit dedicated to the 60th anniversary of Soviet motor vehicle engineering. Those who visited it surely evaluated the advantages of the Likino vehicle engineers' new model on its merits; it is elegant and beautiful. There is a great deal of glass in the design, the body is almost transparent, the doors, with wide windows on the wings, do not fold up like an accordion, but open to both sides. The spacious comfortable passenger compartment, which makes the trolleybus still more pleasant, also is a pleasure to the eye.

MOTOR VEHICLES AND HIGHWAYS

IZh-2126 SEDAN MODEL DISPLAYED

Moscow SOVETSKAYA ROSSIYA in Russian 7 Feb 85 p 4

[Article by A. Korolev: "Meet the IZh-2126"]

[Text] A new model of passenger car, the IZh-2126, has been developed at the Izhmash production association.

"As you see, our car is fundamentally different from the Moskvich that was put out at this enterprise before," says test driver V.I. Zagumennov. "This is the first fully original model. With time it will become a base one..."

The new car belongs to the class of small passenger cars. The dimensions of the interior have significantly increased in comparison with the previous models. Now they are close to those of the Volga (GAZ-24). The "additional space" was obtained thanks to original solutions in lay-out and design of certain assemblies. Moreover, the weight of the vehicle was successfully reduced--now it is exactly a ton.

The appearance of the IZh is unusual; everything is subject to the laws of aerodynamics. Even on the wheels there are special aerodynamic hubcaps... It is no accident that the new model has such low fuel consumption: only 6.2 liters are necessary to travel 100 kilometers. The figure speaks for itself if one considers that the capacity of the engine is 75 horse power.

The car handles beautifully in bad road conditions.

Viktor Ivanovich Zagumennov opened the door: "please".

Comfortable seats. A pleasant interior. There are also many innovations in the passenger compartment. For example, the vent windows are absent; they have been replaced by a powerful modern ventilation system. Visibility from the driver's seat has been improved.

The vehicle seats five. And if it is necessary to carry some sort of freight, the rear part of the passenger compartment easily converts to an extended baggage compartment.

The new IZh recently passed the acceptance tests. Specialists evaluated the model highly: the car is reliable, responsive, easy to control. Next is lot production.

## MOTOR VEHICLES AND HIGHWAYS

### FEATURES OF NEW IMZ-8.103-30 'URAL' MOTORCYCLE

Moscow ZA RULEM in Russian No 3, Mar 85 pp 6-7

[Article by A. Khalturin, deputy chief design engineer, Irbit Motorcycle Plant: "In the Tradition of the Ural Brand"; passages rendered in all capital letters printed in boldface in source]

[Text] Motorcycles produced by the Irbit plant are in constant demand, especially among those who live in the rural areas. On country roads and in the mountains the "Ural" is more mobile and maneuverable than a car, and at times even surpasses a car in cross-country capability. The combination of high load capacity, fine comfort, and its speed qualities make it a multi-purpose vehicle, suitable for business trips, tourism, and recreation.

The basis for the "Ural's" popularity is its proven, reliable design, which corresponds well to the specific nature of operation. For example, the four stroke engine operates on A-72 or A-76 gasoline, which is available everywhere. The drive shaft to the rear wheel is designed to give long and trouble-free service.

The pendulum rods on the rear wheel suspension and on the trailer wheels are installed on rubber bushings which do not require maintenance. The telescoping front fork, and the pendulum suspension on the rear wheel and on the sidecar wheels efficiently dampen shocks and vibration from uneven road surfaces. The body of the sidecar is provided with additional cushioning by means of corrugated rubber elements, which makes the machine more comfortable when traveling on country roads. The double-jaw front brake provides for efficient braking. All the wheels are interchangeable.

On the basis of more than 40 years of experience and tradition in motorcycle production, the plant is constantly perfecting the design. This year IMZ [Irbit Motorcycle Plant] is converting to production of a modernized motorcycle designated the IMZ-8.103-30. In addition to the above-mentioned standard features of Irbit motorcycles, it is distinguished by a number of improvements and new components.

The ENGINE is equipped with an exhaust system with one muffler, situated on the right side, rather than two. The engine housing walls have been made somewhat thicker, thereby increasing its useful life. And the elimination of one muffler at the same time has decreased the overall metal consumption

of the system. The motorcycle has improved cross-country capability. The engine power and the noise level have not changed. The new system is completely interchangeable with the old, and will be sold as spare parts for all "Ural" models.

An important improvement in the RUNNING GEAR is brakes on the sidecar wheels. With the installation of these brakes, the braking qualities and, consequently, the safety of the motorcycle as well have improved significantly.

The frame design has been changed, and the angle of inclination of the rear shock absorbers has been changed, which makes for more efficient operation of the rear suspension and in the final analysis increases the comfort.

There are quite a few new instruments in the ELECTRICAL EQUIPMENT. The ignition lock has been placed on the left headlight bracket. And the headlight itself has a standardized element with a diffuser on the model of the "European beam". The motorcycle has also been equipped with a new tail light. These instruments make traveling safer when it is dark.

"Day" and "night" modes have been provided for the lighting system, which the operator changes by means of a lever situated under his right hand. Next to it is a button for emergency ignition. Under the left hand is the high and low-beam switch, the turn-signal switch, and the horn button. Their design and placement meet contemporary requirements. The odometer has two counters--one is for total mileage and the other (which has a zeroing button) is to measure trip mileage. Together with the illuminating lamps, it amounts to a convenient combination of instruments.

The virtues of the new motorcycle are provided, in particular, by the fact that certain engineering solutions have been carried out as inventions and are protected by patent rights. These include the generator, and the lubrication system with a full-flow filter. The basic articles which are supplied--the lights, the headlights, the tires, the brake shoes, the stop signal switches and others, are at the same level as foreign equivalents, and bear the State Seal of Quality.

With intelligent operation and good maintenance, the new Irbit motorcycle will be a reliable helper in the everyday life of its owner.

#### Technical Characteristics of the IMZ-8.103-30 "Ural" Motorcycle

GENERAL INFORMATION: weight - 320 kg; useful load - 255 kg; top speed - 105 km/h; acceleration time on a 400 meter strip from stop - 26 sec; braking distance at 30 km/h - not more than 6 meters; estimated fuel consumption - 8 ltrs/100 km; fuel capacity - 19 ltrs; tires - 95-484 (3.75-19).

DIMENSIONS: Length - 2,490 mm; width - 1,700 mm; height - 1,100 mm; wheel base - 1,460 mm; road clearance - 125 mm; wheel track - 1,160 mm.

ENGINE: Type - four-stroke, air-cooled; number of cylinders - 2, situated opposite; engine capacity- 649 cc; compression ratio - 7.0; valve mechanism - OHV; power - 36 hp/27 kWt at 5,600-5,800 RPM.

TRANSMISSION: Clutch - dry, dual disk; gear box - four-speed (I - 3.6; II - 2.28; III - 1.7; IV - 1.3); main gear - propellor shaft and universal joint (4.62).

RUNNING GEAR: Frame - tubular, welded, duplex; front fork - telescoping, with hydraulic shock absorbers; rear suspension - pendulum, with hydraulic shock absorbers; brakes - drum.

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## RAIL SYSTEMS

### DEPUTY MINISTER ON 1984 RAILWAYS CONSTRUCTION RESULTS

Moscow GUDOK in Russian 21 Feb 85 p 2

[Article by G. Savchenko, deputy minister of railways: "Build It With Quality and On Time"]

[Text] Moscow--Last year, the construction-installation work plan for the entire ministry (including the Baykal-Amur Main Line and the metros) was overfulfilled by 2.2 percent. Fifteen railroads met their annual program. The Dnepr, Southwestern, Belorussian, Transcaucasian and Southwestern Railroads achieved good results. Their success in this work was greatly aided by businesslike cooperation between the client organizations and the trusts of Mintransstroy [Ministry of Transport Construction].

About 500 km of new railroad lines were built and put into operation last year, along with over 730 km of second tracks and additional main tracks on sections where the throughput was limited. One thousand and ninety-two km of track were converted to electric trains.

Over 2,200 km of automatic block-signaling and centralized dispatching were implemented, along with 1,893 km of main communications cable. Many terminals and stations added new track. Over 5,000 switches were converted to centralized electrical control.

Additional capacity has been added for locomotive and railcar production. Working conditions have improved: 12 new health/general service buildings and six cafeterias were opened.

Plants for the repair of rolling stock and the production of spare parts fulfilled all their 1984 plan tasks for adding productive capacity. Various enterprises added repair shops for diesel locomotives, electric locomotives, railcars, refrigerator units and diesels. They also added steel foundries and shops for producing switches and car retarders.

New railroad stations were built in Dolinsk, Tot'skaya, Navoi, Krasnoarmeysk, Teykovo and Madona.

In 1984, for the first time in many years, the plan for implementing residential buildings and educational and health facilities was fulfilled.



Over 1.5 million square meters of living space was built. About 21,000 railroad families received well-built apartments. In addition, about 40,000 square meters of living space was built on financing from residential-construction cooperatives. General-education schools for 8,944 pupils were put into operation, along with preschool institutions for 8,960 children, vocational schools for 3,450 pupils and 10 hospitals with 1,303 beds. Eleven warehouses for foodstuffs and industrial goods were put into operation, along with storage facilities for 6,000 tons of potatoes, vegetables and fruits; a 100-ton refrigerator in Orsha; three bakeries and four stores.

Construction of the Baykal-Amur Main Line is proceeding swiftly. The annual plan for construction-installation work was overfulfilled by 38.4 percent. The main track was laid before the 67th Anniversary of the October Revolution; trains began operating over the line's entire length a year ahead of schedule.

Together with the organizations of Mintransstroy, who do the main volume of construction-installation work for railroad transport (about 80 percent), the railroads' construction workers also do much work. System-wide, the annual contracting plan was fulfilled. Twenty-four railroad construction trusts fulfilled their programs. The best of these were the trusts of the October, Belorussian, No. 2 Moscow, Southern, Donetsk, Transcaucasian and Far Eastern Railroads.

The railroad construction trusts completed 642,500 square meters of living space. They also fulfilled their tasks for completing general-education schools, preschool institutions, vocational schools, hospitals and polyclinics.

However, there are a number of unsolved problems in capital construction. Above all, the organizations of Mintransstroy did not fully meet the construction plan for projects on the existing railroad system, particularly on the main lines of the Volga region, the Urals, Siberia and the Far East. Nor did they meet their plans at a number of plants for the repair of rolling stock and the production of spare parts.

Due to poor labor organization and poor coordination of labor, material and equipment resources at the construction sites, 40 Mintransstroy trusts did not fulfill their tasks for the Ministry of Railways. The Permstroyput' [Perm Track Construction], Abakantransstroy [Abakan Transport Construction], Kuzbasstransstroy [Kuzbass Transport Construction], Zapsibtransstroy [West Siberian Transport Construction], Dal'transstroy [Far-Eastern Transport Construction], Orenburgtransstroy [Orenburg Transport Construction], Altaytransstroy [Altay Transport Construction], Angarstroy [Angara Construction] and Vossibtransstroy [East Siberian Transport Construction] Trusts fulfilled their plans by only 49-73 percent.

Locomotive facilities are being erected slowly (74.9 percent of plan). Construction of hoist-repair shops in Aktyubinsk, Agryz, Petrov Val and Ayaguz is going poorly.

Mintransstroy trusts have not fulfilled their plan for construction-installation work at plants of the Central Administration for the Repair of Rolling Stock and the Production of Spare Parts. Nor have they implemented the resources allocated for the development of the Tayshet, Achinsk-1, Ukladochnyy, Krasnoyarsk, Irkutsk-Sortirovochnyy and Batevo Stations.

However, the railroads themselves can be criticized. Eight railroads did not meet their plans for construction-installation work. The worst of these were the Central Asian, Transbaykal, Alma-Ata and West Kazakhstan Railroads.

The most serious deficiency in organizing capital construction is that the plan contains projects that are not ready for construction: they lack planning and estimating documentation; land has not been allocated; the facilities have not been provided with process equipment, materials and structures and, most importantly, there is a shortage of workers.

The Main Planning and Economics Administration and the chief engineers of a number of railroads were not demanding enough, nor did they adhere to principles in forming their 1984 plans. It turns out that up to 1 July of last year, the plan included over 30 million rubles worth of unprepared projects. The operating and power-generating equipment for the Karymskaya-Shilka, Belogorsk-Shimanovskaya and Agryz-Shemordan electrified sections were not supplied on schedule.

Violations of Construction Norms and Rules, specifications and project decisions have occurred on the railroads and at construction sites. These violations have occurred on the Gorkiy, Kuybyshev, Sverdlovsk and West Kazakhstan Railroads in the following areas: 1) in the erection of earthen roadbeds and artificial structures on certain sections of new lines and second tracks and 2) in the construction of residential housing and social and service facilities.

Throughout nearly all of last year, the construction subdivisions of the Railway Ministry's railroad organizations and plants and the railroad construction trusts worked unsteadily; they were far behind in fulfilling their plans. The same thing occurred with the programs for residential and community construction, automatic block-signaling facilities, centralized dispatcher facilities and railroad-line electrification. For the first nine months, the railroads' line enterprises fulfilled their annual plan for construction-installation work by only 57 percent.

Attention was given to this situation, and several construction-organization managers were disciplined. The work pace accelerated in the fourth quarter. However, speed often came at the expense of quality--a high price to pay.

Measures are now being taken to transfer deadlines from the fourth quarter to the second and third quarters. This year's plan provides for the

further growth of railroad transport. The main part of capital investments is being put into projects that will: further increase the throughput and tonnage capacities of the lines; improve the railroads' operating performance and further improve the social and living conditions for railroad workers and their families.

The plan is to build and put into permanent operation 1,200 km of new lines; 680 km of second tracks; 1,500 km of electrification lines; 2,200 km of automatic block-signaling and centralized dispatching; 1.6 million square meters of total residential area and many schools, preschool institutions, hospitals and polyclinics.

Organizing work must be improved to realize the statute of the CPSU Central Committee and the USSR Council of Ministers on improving the planning, organization and management of capital construction. The managers of Railway Ministry administrations, railroads and transport enterprises must work together with subcontractor organizations in order to quickly develop specific organizational-technical measures on the most important priority construction projects and on the main sectors of the railroads. They must reassign the construction and installation subdivisions to new work sites and take other measures that will guarantee the necessary construction pace.

It will be important to concentrate resources on measures that will: increase the throughput and tonnage hauling rate; provide the greatest economic return; improve labor productivity; reduce transport costs and increase the return on investments.

Much work remains to be done to improve the performance of railroad construction-installation trusts. Their annual volume of contract work has reached 635 million rubles, and will reach 900 million by the end of the 12th Five-Year Plan.

The Ministry has taken additional measures to strengthen the productive capacity of the railroad construction organizations. The output of precast reinforced-concrete structures is to be increased to 1.425 million cubic meters; the output of carpentry work to 977,000 square meters and the output of large-panel and large-block building elements to 340,000 square meters. It remains to: implement leading technology and scientific organization of labor; mechanize and automate labor-intensive processes; expand the brigade-contract system and prepare qualified personnel.

The successful fulfillment of the capital construction tasks in the 11th Five-Year Plan will have a favorable effect on the overall performance of rail transport. The rail-transport workers are determined to achieve new labor victories by the 27th CPSU Congress.

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## RAIL SYSTEMS

### IDZHEVAN-RAZDAN RR CONSTRUCTION BEHIND SCHEDULE

Moscow GUDOK in Russian 11 Apr 85 p 2

[Article by A. Barsegyan, director of the customer group, and S. Babayan, GUDOK correspondent: "Idzhevan-Razdan: The Startup Schedule is Pressing"]

[Text] Yerevan-Razdan--Any construction project in Armenia will be in the mountains. The Idzhevan-Razdan Railroad Line is truly such a project.

The new shortest route between Yerevan and Tbilisi is of great significance for the social and economic development of Armenia. This is the most critical year in the construction program: the Idzhevan-Razdan Line is to go into operation in December.

The operating length of this unique route is over 77 km, including over 16 km of tunnels. The route has 20 large bridges and viaducts, and over 200 engineering structures. And now, with the end only a few months away, how is the project going?

The startup schedule for the first quarter stipulated that 7.3 million rubles be implemented, and in fact 8.4 million rubles were implemented. On the basis of that indicator alone, there would be no criticism of the construction workers. For the sake of fairness, it should be noted that there were unprecedented cold temperatures, down to 40 degrees below zero. But the implementation of resources is not the entire matter; another aspect is how the construction program is being carried out and whether the schedules are being met.

Here, the situation is far from encouraging. Take, for example, the Idzhevan-Dilizhan section, which was opened for traffic back in December 1982. Unfortunately, the trains did not run for long on this section. Ground creep was discovered in places near the Kuybyshevo Siding, and resources had to be diverted to reinforcing the tracks. Because of this, and also because of poor organization, a 35-km section is still not ready to accept traffic on a continuous basis.

Let's go further down the line. On the 7-km-long Idzhevan-Lusabats section, the track is basically finished, and the contact circuit and electric power lines are being installed. However, further on, in the

Akhtikhlu-Kuybyshevo-Dilizhan sections, the track was laid on only one layer of ballast. There is much work left to do in constructing the service-engineering buildings. These facilities must be finished on schedule, because it will take a long time to install the necessary equipment after construction is completed. If the construction work drags on, then things will be rushed and installation quality will be sacrificed.

The installation of equipment at all the substations must be accelerated, for the deadlines are fast approaching.

A huge volume of earthwork has been done along the route. However, there are sections where this work must be completed very quickly. Mechanized Column No 117 of Yugstroy Mekhanizatsiya [expansion unknown] is doing the earthwork in the section between the 79- and 96-km markers. The column still must move at least 300,000 cubic meters of earth. This is a realistic figure, but all forces must be mobilized and work must be well organized to achieve this goal.

Most of the bridges on this section are now being finished off, but two spans have yet to be installed. The work pace must be accelerated here.

But the tunnelers still have the most work left to do. The Megradzorskiy Tunnel is still about 600 meters from completion. To finish on time, 180 meters per month must be driven. Tunnelers from Arpasevanstroy [expansion unknown] are working from the south, while tunneling detachment No 8 of Armtonnel'stroy [expansion unknown] is approaching from the opposite direction. The average monthly advance of the "southern" team is 70 meters, while that of the "northern" team is 5 meters less, for a total of 135 meters. That is still 45 meters less than necessary. What are the reasons for the delay? The main problems are poor work organization and low productivity on the part of the tunnelers. The intervals between shifts are sometimes too long. Transport service and electricity disruptions, more frequent during the winter, also held up the work.

But tunnel driving does not complete the cycle. The tunnel will need concrete lining. At the beginning of April, over 2,000 linear meters of tunnel needed to be lined. Simple arithmetic suggests that the situation is alarming. The deadline will not be met at the present pace. The paces of tunneling and finishing work must be at least tripled.

The tunnel cuts across fractured aquifers and extremely hard porphyrites. Cave-ins have occurred, requiring a lot of clean-up time. In short, every meter of advance is a struggle. Therefore, the general contractor and the construction workers need to take on their work with renewed vigor. For instance, they must not take even one extra day to "unpack" additional concrete lining machines.

A new and powerful tunneling machine has now been put to work on the Megradzorskiy Tunnel. So-called movable concrete forms have been implemented. The construction workers are switching over to brigade cost accounting, with the aid of the Central Scientific Research Institute of

Transport Construction (Ministry of Transport Construction). This is all very good, but there is no time for dawdling. It is particularly important that innovative work methods, as well as progressive forms of labor organization and payment, be implemented as quickly as possible. This will speed the tunnelers' work, and the other workers will then have enough time to lay the tracks in the tunnels and install the power supply and automatic devices.

Much work remains to be done in the group of Dilizhan tunnels and in the tunnel at the 89-km marker. Deadlines are approaching, and the schedule must be met everywhere. This means that everyone participating in the construction of the Idzhevan-Razdan Line is fully responsible for meeting the schedule.

But one gets the feeling that many people do not fully understand this. For instance, the collectives of SMP-808 [Construction-Installation Train] of Transsignalstroy [expansion unknown] and EP [expansion unknown] No 759 of Transenergomontazh [expansion unknown] are not fulfilling their tasks on the Idzhevan-Dilizhan section.

Tunnelers from Minsk, Tbilisi and Kiev have arrived to help Armenia in this work. And the result? The Kiev tunnelers advance an average of 40 meters a day, while the brigades from Armtonnel'stroy advance 10, or at best 15 meters.

The reason is simple. The Kiev workers have a tunneling machine. The Minsk tunnelers have two such machines. They brought their equipment with them. Armtonnel'stroy didn't consider this at the proper time. Most of their brigades are equipped with small-scale mechanization, and this is the reason for the difference in indicators.

It's apparently not too late to introduce modern tunneling equipment. Otherwise, it will be difficult to meet the deadline.

A working group has now been formed at the construction site to implement the necessary project corrections because of changes made when laying the individual sections of the route. Unfortunately, the group is working very slowly, and its work volume is constantly increasing.

One more thing should be said in conclusion. Today, much on the route is changing. The startup program is paramount, and everything now must conform to it. These conditions in turn necessitate that the resources be scrupulously calculated, that personnel be assigned to the proper place at the proper time and that everyone be provided with everything necessary for successful performance. Installation trains and specialized organizations of Transelektromontazh [expansion unknown], Transsignalstroy and Transsvyaz'stroy [expansion unknown] have now joined the ranks of the construction workers on the route. However, some parts of the project are still short-handed. Therefore, these forces must be better managed.

Not only the tunnel work needs to be completed, but also over 3,000 reinforced-concrete pylons need to be installed for the contact wires, many kilometers of wire needs to be hung, the automatic block-signaling system needs to be installed and much more. Only the coordinated efforts of all the participating construction subdivisions participating will ensure that the line is finished on time.

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OFFICIAL OUTLINES PLANNED SOVIET METRO SYSTEM DEVELOPMENT

Moscow SOVETSKAYA ROSSIYA in Russian 5 Mar 85 p 1

[Interview with Yuriy Yevgen'yevich Kruk, chief of the Metro Capital Construction and Renovation Administration, Glavmetropoliten [Main Metro Administration], USSR Ministry of Railways, by A. Dyatlov, date and place not specified: "Tomorrow's Metro"]

[Text] The CPSU Politburo Central Committee has considered the future development of metros. We asked Yu. Ye. Kruk, chief of the Metro Capital Construction and Renovation Administration, Glavmetropoliten, USSR Ministry of Railways, to comment on this document.

[Question] Yuriy Yevgen'yevich, as far as is known, this is the first time that the metro development program is being considered at this level: the USSR State Planning Committee (Gosplan), USSR Ministry of Railways and USSR Ministry of Transport Construction helped prepare the program. What is the reason for this?

[Answer] Only several decades ago, the metro was considered the mode of transport for a few "capital" cities (the word "metro" is derived from the word for "capital"). The first lines were built in Moscow, Leningrad and Kiev. But, in recent years it has become very obvious that a metro can be the best way of solving transport problems in large cities, especially those with populations approaching one million. If more than 15,000 people are travelling in one direction--to or from work--during rush hour, then surface transport, such as buses, trackless trolleys and streetcars, are unable to handle the passenger flow. In recent years, several cities have asked us to build metros for them. USSR Gosplan has done much research on the amount of travel for cultural, work and shopping activities in these cities. We received the findings on integrated transport plans, which consider the necessity of including a metro in the system. Based on these plans, the USSR Ministry of Railways, as the customer, developed a "Metro Development and Routing Plan for the USSR Up to the Year 2000." This latter plan in turn became the basis for the "Plan for Future Construction of New Metro Lines in the Country's Largest Cities."

[Question] What cities are we talking about?

[Answer] There are about 20, and metro construction work in these cities during the 12th Five-Year Plan will be carried out in 5 basic directions. The first direction is expansion of existing metros: new lines and stations will be built in Moscow, Leningrad, Kiev, Tbilisi, Baku, Kharkov, Tashkent, Yerevan and Minsk. In addition, we will put two new metros into service this year: in Novosibirsk and Gorkiy. Next will be construction work on metros in Kuybyshev, Sverdlovsk and Dnepropetrovsk. This work was begun in the 11th Five-Year Plan, and the metros are to go into operation in the 12th Five-Year Plan. The third direction is new construction: residents of Riga and Alma-Ata will be happy to know that the plans for metros in these cities have been approved by our ministry. The last two points of the program are to begin survey work and to develop construction plans for new metros in Chelyabinsk, Omsk and Krasnoyarsk.

[Question] Now, please tell us in more detail about the country's main metro, the Moscow Metro.

[Answer] It will also be expanded in the 12th Five-Year Plan. Lines will be extended to Teplyy Stan and Bittsevskiy Park, and from Preobrazhenskaya Square to Podbel'skiy Street. Decisions are being made on building a new Timiryazevskiy Radius and extending the line to Krylatskoye.

[Question] Leningrad has now proposed that a metro line be built "ahead of time" to serve areas where the passenger flows are still small, but where there will eventually be hundreds of thousands of residents. Is there any comparable experience in Moscow?

[Answer] Unfortunately, not yet. The same goes for other metros. But this is the approach for which we are striving; this way, Leningrad will develop the new Rybatskoye Rayon without experiencing transport problems. Of course, this type of construction is fairly expensive: full volume on the line will only be reached gradually. But in any case, it will justify itself in future years.

[Question] Have any provisions been made for building an outer ring metro in Moscow, as has been much talked about lately?

[Answer] This question is still being discussed. Although Moscow's metro plan--a ring-radius layout--is the most suitable, the addition of a second, outer, ring might be inconvenient for the passengers: it would be of enormous diameter, making travel times longer than the normal 40-45 minutes. There is another alternative: express lines with fewer stops, operating at high speed between stations. This would get the metro passengers to work in the same 40 to 45 minutes. Express lines might directly connect outlying areas with workplaces.

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RAIL SYSTEMS

KRASNOYARSK METRO SYSTEM PLAN APPROVED

Moscow GUDOK in Russian 13 Apr 85 p 4

[Article by Yu. Vakhrin: "The Metro Will Come to the Yenisey"]

[Text] The USSR State Planning Committee has approved a city transport development plan for Krasnoyarsk. Within 15 years, one fifth of the passengers will be riding on subways.

"The first phase of the metro will connect the areas in Krasnoyarsk's left bank," says the city's chief architect, E. Panov. "Eleven stations will be built in the most populated places: the Akademgorodok area, the train station, Central Revolution Square and the airport. The second phase will cross the city from south to north and will connect the right bank of Krasnoyarsk with Solnechnyy, the new residential settlement for machine builders."

Construction of the new Siberian metro will involve a number of difficulties, both mining-geological and climatic. Construction workers and designers from Novosibirsk, where the first metro lines are being readied for passengers, will come to assist in Krasnoyarsk.

Although the Krasnoyarsk Metro is still in the future, the transport development of this city on the Yenisey is already taking into account its construction. For instance, the passenger line which was put into operation early this year will become one of the metro's surface lines.

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## RAIL SYSTEMS

### RIGA METRO SYSTEM DESIGN APPROVED

Moscow TRANSPORTNOYE STROITEL'STVO in Russian No 3, Mar 85 p 63

[Report from USSR Ministry of Transport Construction: "Chronicle--at the Scientific and Technical Council"]

[Text] The Section for Construction of Tunnels and Metro Systems debated and has basically approved the plan for the first phase of the Riga Metro, a 9-kilometer section.

Eight stations are being constructed along the route for the first section, including those at Zasulauks, Avrora, Daugava, Tsentr, Kirova, Raynisa, Oshkalny and VEF. The terminal runs at each end are planned for shallow tunnels, while the rest will be in deep tunnels in the center of the city.

Water drawdown will be employed when building the metro tunnels, not only in the shallow sections, which are situated in water-bearing sands, but also in the deep sections, where the Shventoyskiye deposits will be opened, as well as during construction of the shafts and inclined tunnels.

The nearly universal utilization of water drawdown or contour or through freezing of the soil are required during construction of the inclined tunnels and shafts as well as of the run tunnels.

Construction time for the first phase is 7 years.

The load-bearing linings of the tunnel designs which have been accepted are basically prefabricated, made from cast iron tubing and reinforced concrete components. Vestibule designs in part call for cast-in-place reinforced concrete.

Cast iron and precast reinforced concrete linings made from flat components and completely closed rectangular sections have been used for the run tunnels.

Construction of the metro's engineering building and buildings for the metro service's operations personnel are specified near the Tsentr Station, while construction of the car depot, connected to the metro line by a double-tracked spur 0.96 kilometers long, will be in Zasulauks Rayon.

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## RAIL SYSTEMS

### CHIEF ENGINEER ON ODESSA METRO SYSTEM PLANS

Moscow GUDOK in Russian 3 Apr 85 p 4

[Interview with Yuriy Vladimirovich Yukhov, chief design engineer of Lenmetrogirotrans, by F. Kamenetskiy, Leningrad, date not specified: "Metro in Odessa"]

[Text] Leningrad-Odessa--I'm in the office of the chief design engineer of Lenmetrogirotrans [Leningrad affiliate, State Planning and Research Institute for the Construction of Subways and Transport Facilities], Yu. Yukhov. Yuriy Vladimirovich gets a thick folder entitled "Odessa". On the cover's bottom corner is a red line with circles. This is the plan for the initial section of the first line. The names of the future stations are indicated, along with the distances between the stations.

"So it will always be handy," he explains.

First, some background information. Odessa is one of the country's largest economic, scientific and cultural centers--a port city of over 1.1 million people. It stretches for 30 km from north to south. The railroad terminal is in the central part of the city; therefore, its tracks interrupt transport traffic on the city's main routes. Intracity passenger transport is now provided by streetcars (about 50 percent of all trips), trackless trolleys, buses and commuter trains. The volume of travel is steadily rising, outstripping the pace at which the city's population is growing.

In determining the technical possibilities and economic feasibility of building a metro in Odessa, the Lenmetrogirotrans personnel first of all studied reports on future growth of the city. They also did on-site investigations along the future routes.

[Question] Where will the first metro line be located?

[Answer] It will cut across the entire city from north to south and will connect the new, fast-growing residential areas with the city center and the large industrial zone of Peresyp'. The Malinovskiy-Suvorovskaya Line will be about 29 km long and have 19 stations.

In order to provide maximum improvement in city transport as quickly as possible, an initial section of the Malinovskiy-Suvorovskaya Line--from the Pionerskoye Electric Railroad Depot to the city center--has been designated a priority project. The depot is close to the Odessa Classification Yard, and is on alluvial ground. The depot has 20 workplaces for doing all types of maintenance and capital repairs on rolling stock. Five-car trains will travel along the line at a rate of 30 pairs per hour.

A computer center will provide automatic traffic control. It will automatically calculate the trains' travel time and the intervals between trains in accordance with a traffic schedule.

Yuriy Vladimirovich shows me a diagram of the initial section of the first line. It starts at the depot near Kuyalnitskiy Estuary. The route makes a sharp turn to the first station, then follows along the Black Sea coast and finally diverges toward the city center.

[Question] Where will the stations be, and what will they be called?

[Answer] The initial section will be nearly 15 km long. Eight stations are planned along the section. The first of these, the Pionerskaya, will be at the intersection of Nikolayevskaya Road and Dunayevskiy Street, near the campground. The metro line goes south from there. The next station, Luzanovka, will be next to the Park of Culture imeni Kotovskiy. The third station, Peresyp', is very close to the Odessa-Peresyp' Railroad Station, between Moskovskaya and Bogatyy Streets. The next stations are Raysovet, Ulitsa Suvorova, and Deribasovskaya. The final station on the section is Vokzal'naya.

The initial line of the Odessa Metro will be dug out of bedrock, which is dense clay. There are interlayers of dusty sands in some places. In other places, there are aquifers with which to contend.

There will be broad possibilities for using the latest achievements of science and technology in building the Odessa Metro. This will greatly reduce construction times, while at the same time reducing capital investments.

[Question] Yuriy Vladimirovich, how long will the construction take?

[Answer] The projected construction period for the initial section of the first line will be about 7 years. However, preparatory work must precede the actual construction. First of all, a construction trust must be established. Specialists must be brought in and provided with living quarters and shopping, service and cultural establishments. Secondly, the

work must have its own production base: an iron foundry, a reinforced-concrete plant, a depot and a motor-vehicle base. In addition, a specialized vocational school will be needed to train metro personnel. The city must start preparing for this now.

[Question] What are the future prospects?

[Answer] The metro route will connect the train station with Cheremushki and Tairov Village. The third phase of construction will extend the line toward the large residential area of Kotovskiy Village.

I left the building of Lenmetrogiprotrans and went down the escalator into the marble-lined vestibule. The subway train arrived. The driver announced over the loudspeaker: "Be careful. The doors are closing. The next station is..." It will soon be like this in Odessa.

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## RAIL SYSTEMS

### CONSTRUCTION DIFFICULTIES, DEVELOPMENT OF NOVOSIBIRSK METRO

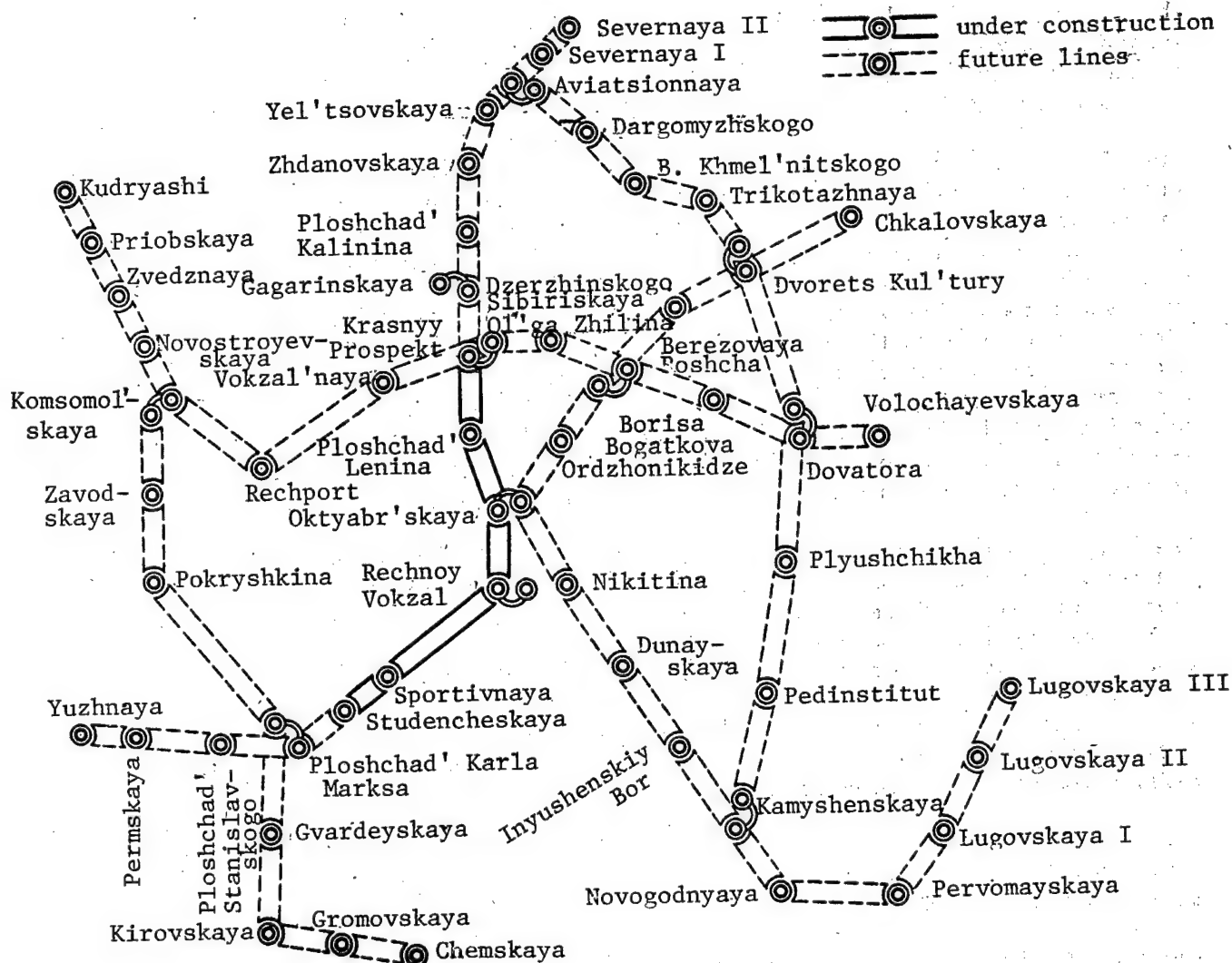
Moscow TRANSPORTNOYE STROITEL'STVO in Russian No 4, Apr 85 pp 18-20

[Article by S. A. Smirnov, chief of Novosibirskmetrostroy, Yu. G. Samochernov, chief of Novosibmetroproyekt and B. V. Koryakin, senior science associate of SibTsNIIS (Siberian Central Scientific Research Institute for Construction): "The First Siberian Metro"]

[Text] Work has entered the final stage of building the first metro in Siberia, the construction of which commenced in Novosibirsk in 1979. Already completed are the drilling and erecting of the finishing of seven of the ten line tunnels which are part of the nearly-completed first stage. Drilling is being completed on two tunnels from the depot to Krasnyy Prospekt Station. The last section of Oktyabr'skaya--Rechnoy Vokzal has been prepared for construction. All five stations of the first stage are also concluding the finishing work, and two of them, Oktyabr'skaya and Studencheskaya, have the finishing work completed. However, the volume of remaining work is still great both for Novosibirskmetrostroy [Novosibirsk Metro Construction Administration] as well as for the subcontractors.

In parallel with the development of work to build the first stage, designing is underway on the subsequent stages of construction in accord with the plans for the development of the Novosibirsk Metro worked out by Novosibmetroproyekt [Novosibirsk Metro Design Institute]. The plan includes the designing and construction of 5 lines with a total length of 93 km, the construction of 66 stations, 9 transfer junctions, including 3 transfer junctions from the metro to the suburban railroad lines.

In the designing and construction of the Novosibirsk Metro, a number of new technical ideas and developments have been employed making it possible to improve quality and reduce labor expenditures and construction costs. Thus, for the first time in our nation for building line tunnels the KT-5.6D2 tunneling unit has been employed with changeable working parts. In the process of installing and operating this unit, rationalizers from Novosibirskmetrostroy introduced a number of improvements making it possible to improve its indicators and adapt it to local conditions. As a result, even during the stage of production testing, a speed of 100 m per month was achieved and subsequently 140 m a month. For introducing this unit a group of construction workers was awarded gold, silver and bronze medals of the VDNKh [Exhibit of National Economic Achievements], while the tunnel detachment No 29 received a VDNKh diploma, first degree.



Future System for Development of Novosibirsk Metro

In digging the station excavations, ground anchors<sup>1</sup> were employed and the development and introduction of these involved co-workers from Novosibirskmetrostroy and Novosibmetroyekt as well as the SKTB [Special Design Bureau] Glavtonnel'metrostroy [Main Metro Tunnel Construction] and the VPTItransstroy [All-Union Design and Engineering Institute for Transport Construction]. As a result it has been possible to reduce metal consumption and reinforcing costs and most importantly to use the anchors to reinforce a pit 32 and 40 m wide as well as the tunnel portal where traditional types of reinforcing were ineffective.

Also used in construction were the MOV-40 pneumatic drills and the RPB-40 jackhammers making it possible to increase labor productivity in construction and easing the work of the workers.

<sup>1</sup> See TRANSPORTNOYE STROITEL'STVO, No 3, 1984, p 17.

The use of the VVO-21R ventilating units instead of the VOMD-24 also promises a substantial savings as this will make it possible to reduce the amount of work on the ventilating chamber, metal intensiveness and construction costs (up to 40,000 rubles per ventilating installation).

One of the most important achievements in the first attempts of building a subway in Siberia must be considered the establishing in the region of a range of specialized organizations for metro construction, including Novosibirskmetrostroy and Novosibmetroproyekt. The work plans were successfully carried out by a department of the SKTB Glavtonnel'metrostroy which was recently organized in Novosibirsk. The Western Siberian Affiliate of the VPTItransstroy has provided active help to the construction workers in drawing up flow sheets and introducing the advanced achievements and developments of the scientific organizations. Scientific support for designing and construction have also been provided by SibTsNIIS, NIIZhT [Scientific Research Institute for Rail Transport], the Mining Institute of the Siberian Division of the USSR Academy of Sciences as well as other VUZes and scientific research organizations from Novosibirsk.

The city's workers have also provided substantial aid. More than 85 city organizations have participated in building the metro. Aside from moving the utilities, they have performed such major jobs as building the production facilities of Metrostroy [Metro Construction Administration] with a total cost of 32 million rubles and a metro depot [subway barn] with a cost of 9 million rubles (Glavnovosibirskstroy [Main Novosibirsk Construction Administration]), an engineer building costing 1.5 million rubles (Sibakademstroy [Siberian Academy Construction]). The city is supplying the metro builders with prefabricated reinforced concrete elements and building materials.

A city staff headed by the first secretary of the CPSU gorkom has effectively coordinated the activities of the numerous organizations in the city involved in the construction.

The scientific research to support designing and construction has been carried out within the program approved and supervised by the Oblast Council for Assisting Scientific-Technical and Socioeconomic Development Under the Novosibirsk CPSU Obkom. The council has a metro subsection which is part of the "Construction" Section.

All of this confirms that the building of the Novosibirsk Metro has been possible with the constant leadership and practical aid from the party and soviet bodies of the oblast and city.

According to the results of geological prospecting which preceded the building of the metro, it was assumed that the geological construction conditions for the first stage were very favorable, since the route ran significantly (20-30 m) above the groundwater level, while the loess loams and sandy loams promised a definite stability in the ground massifs. In actuality, in digging the first pits for the stations and in drilling the first line tunnels, these suppositions were seemingly confirmed. However, the more than 5 years' experience in construction have forced a revision of the initial conclusions.

The problem is that the territory of Novosibirsk, like the territory of other major cities, has been subjected to constant flooding by industrial water caused by the accidental malfunctioning of the water and sewage lines, by changes in surface drainage and other factors. In line with the fact that Novosibirsk is a young city (it is 90 years old), and this process appeared actively only in the 1950's with the growth of the city and the construction of large enterprises in it, the flooding had not fully ended. In individual areas of the city where the last stages of the metro will run, the groundwaters, as research has shown, over the 30-40 years have risen 20 m and more and are presently 2 m below the surface.

In the central part of the city, this process obviously is in the developmental stage and the construction workers on certain sectors have encountered individual areas of flooding, sometimes rather significant. As a rule, these areas have not been discovered in prospecting and the encountering of them has often led to emergencies. Thus, in the pit of the spur behind Studencheskaya Station, the water burst through in a trough from under a tie beam and then the water washed the dirt away behind the beam and carried around 3,000 m<sup>3</sup> of dirt into the pit. Here the stress was sharply increased on the pilings and buntions, a portion of which failed while the girdle on which the buntions rested was deformed; several reinforcing pilings were also deformed. The emergency occurred in several hours and this process halted after the accumulated water had run off. Water had accumulated underneath a heating line running along the pit.

At this same station but in another sector, in drilling a well to set the ground anchors, at a distance of 10 m from the pit a zone of increased moisture content was discovered with a ground temperature of 37° C. It turned out that this zone more than 40 m long also was under the heating line.

In cutting the line tunnels from the barn toward Krasnyy Prospekt Station, in crossing the heating line and water line the tunnels entered an area of water-logged ground. As a result, significant effort was required, including the use of special work methods for crossing it, as ground stability had sharply deteriorated and regardless of the careful reinforcing of the head of the face, water with ground broke into the tunnel. The bearing capacity of the foundation also declined, the heading machine "sank" in the ground four times and very significant additional work was required to bring it to the design position. A portion of the erected finishing also had to be redone as this could not be held by the wet base. The zone of such water-logging is more than 300 m long.

There were more than 10 other occurrences, less significant in volume but also holding up the construction pace and requiring additional expenditures to eliminate them. The given examples caused a revising of the opinion on the ground conditions of Novosibirsk as favorable for construction. To a certain degree the encountering of unforeseen water-logged sectors along the route is more dangerous than a complete flooded area when even in the design stage provision can be made for constant lowering of the water level or other measures which make the construction process more stable, although requiring constant additional expenditures.

Moreover, as the measurements by SibTsNIIS showed, the stress on the excavation pit reinforcing did not remain constant during the process of its use. After

the load had stabilized for several months after the pit had been dug, changes were observed in it related to the flooding of the area in the spring (here the increase in the stress on a bunt reached 200 kilonewtons) as well as during a period of heavy rains, when these stresses increased sharply.

All that has been described forces one to conclude that under the conditions of Novosibirsk, the designing of the metro should be carried out considering the subsequent ground saturation and necessitates research on the forecasting of the hydrogeological conditions. Here one must also consider the draining effect of the cuts by the stations and the barrage effect of the stations and tunnels which can change the established hydrogeological conditions in operating the metro.

The Novosibirsk Metro is being built and will be operated under more severe climatic conditions than other domestic and foreign metros. The annual average temperature in Novosibirsk is below 0° C. The difference in the climatic indicators between Moscow where a metro is operated under the severest climatic effect in our nation and Novosibirsk is the same as between Moscow and Tashkent, where the southernmost metro of the nation is located.

In carrying out the construction and installation work, significant difficulties arose basically in open air work in digging the permafrost, in sinking and removing pilings, in laying slab concrete and mortar, in insulating work and a number of other operations. It must be pointed out that in building the first stage, these difficulties were partially avoided, since work was being carried out simultaneously on building five first-stage stations and two second-stage stations. This made it possible to plan the work in such a manner that a larger portion of the listed operations could be done in the summer, leaving the winter season basically for installing the structural elements. However, in building the subsequent stages, when it will be necessary to organize year-round flow construction of the stations, these difficulties will tell negatively on the construction pace and cost.

All that has been said above as well as the necessity of carrying out protracted in-situ research on the manifestation of rock pressure on the sections and stations and the need to improve a number of designs and production processes make it essential to organize, under Novosibirskmetrostroy, laboratories for the construction of subways under severe climatic conditions. This question is all the more pertinent as the construction of metros is also planned in a number of other Siberian cities.

These and a number of other difficulties accompanying the design and construction of the Novosibirsk Metro and caused by the specific climatic, geological-engineering and urban development conditions, have mobilized the collectives of the Novosibirsk construction, design and scientific organizations to further active work to surmount them. The workers, engineers, technicians and scientists of Novosibirsk are fully determined to open the first metro in Siberia on time.

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## MARITIME AND RIVER FLEETS

### UKSSR RIVER FLEET PERFORMANCE IN 1984

Moscow VODNYI TRANSPORT in Russian 5 Mar 85 p 1

[Article from Kiev by L. Yushkevich in the column "A Worthy Welcome for the 27th CPSU Congress": "Manage Efficiently--Ukrainian River Transport People are Working under this Motto in the Five-Year Plan's Final Year"]

[Excerpts] As has already been reported in our newspaper, results of the republic's river transport people's work in 1984 were discussed at an extended meeting of the UkSSR Council of Ministers' Main Administration of the River Fleet collegium and the presidium of the Dnieper Basin Committee of Labor Unions for Workers of the Maritime and River Fleets, and new standards were outlined for successfully completing the tasks of the 11th Five-Year Plan defined by the 26th CPSU Congress, subsequent party Central Committee plenums and the instructions of General Secretary of the CPSU Central Committee and Chairman of the USSR Supreme Soviet's Presidium comrade K. U. Chernenko contained in his articles and speeches.

The reporting speaker, Chief of the UkSSR Council of Ministers' Main Administration of the River Fleet N. A. Slavov, thoroughly analyzed the state of affairs in the republic's river transport. Favorably appraising the experience and achievements of leading fleet collectives and river transport industrial enterprises, he noted that Ukrainian river transport workers provided program fulfillment ahead of schedule for four years of the five-year plan and the socialist obligations assumed in 1984. Moreover, the quota for cargo carriage and turnover was fulfilled both in the sum of annual plans and in approved planning figures. By comparison with the corresponding period of the 10th Five-Year Plan, the growth of cargo carriage amounted to 13.7 percent in tons and 15.8 percent in cargo turnover. Labor productivity for 1984 was increased with respect to the planned: By 1.2 percent in cargo carriage, by 1.8 percent in loading and unloading operations, by 4.7 percent in voyages and by 2.7 percent in industry. The tasks and obligations for reducing the production costs of products and transport operations and for economizing fuel and power resources were fulfilled.

Cargo deliveries on vessels of mixed river and sea navigation occupy a prominent position in the growth of cargo carriage by the republic's river transport. Foreign carriages increased twofold in tons and by 1.76 billion ton-kilometers, or 41.7 percent, in cargo turnover during four years of the five-year plan. During this same time, 5.1 million tons of national economic cargo were handled above plan in the republic's river ports.

Last year's shipping season in the Dnieper Basin took place in relatively difficult circumstances: It started 10-12 days later than usual, and a bitter cold snap in the middle of November, stormy weather and fog negatively affected the fleet's working tempo and led to reduction of its transport capability. However, in spite of these and other difficulties, planned quotas of the five-year plan's fourth year turned out to be successfully fulfilled, thanks to the selfless work of all the republic's river transport workers' collectives as well as the timely implementation of planned organizational and technical measures, which were expressed, first of all, in a great deal of work on seeking out and attracting cargoes and introducing an optimum cargo-carrying system, in further expanding the operating mode of cargo-carrying motor ships with strengthened pushing attachments, and in a number of other measures. The year's growth in cargo carriage, as compared with the plan, constituted 2.4 percent in tons and 4.6 percent in cargo turnover. Fulfillment of planned quotas was provided in practically the entire list of transported goods in a given economic region.

All plants and repair and maintenance bases having an attached fleet managed to fulfill their shipping plans.

Further reduction in the fleet's standing idle during cargo handling is an achievement of the dockers--The average norm for the year was lowered by 18.4 percent as compared with the planned and, when processing railroad cars, it was lowered by 13.9 percent.

Plan fulfillment was exceeded significantly in the non-self-propelled fleet's work productivity. For this type of vessel, it constituted 109.5 percent of the plan, and was higher by 12.7 percent than the preceding year's indices.

Analyzing the achievements in detail and outlining the new standards for the final year of the 11th Five-Year Plan, the reporting speaker, and many who made addresses, noted that there still exists much room for improvement in the work of the Main Administration and many of its subdivisions. It was noted, in particular, that the republic's river transport workers solve fleet workload problems in an unsatisfactory manner, especially in the intrabasin lines. The Ministry of Railways [MPS] decision on discontinuing freight transports with two transshipments, from which river transport workers did not draw the proper conclusions in time, had a very adverse effect in this regard. In result, the year's quota for the self-propelled dry cargo fleet's productivity turned out to be unfulfilled (98.7 percent). What are the reasons for this situation? There are several.

Self-propelled cargo vessels stood idle awaiting fuel, especially at the end of the shipping season, for 1,250 tonnage-days, and this led to unplanned losses of 131 million ton-kilometers of transport production. Reducing the fleet's unproductive idle stands with coal at the specialized Tripolye Port didn't work. The operation of this port causes great alarm for the forthcoming shipping season also, because of all the cargo-transfer machinery's breaking down. The situation is no better in Chernobyl either, where the Upper Dnieper Shipping Company regularly frustrates timely delivery of ore-transshipment tonnage. Losses there during the report year amounted to 480,000 tonnage-days due to above-plan waiting to unload.



Despite improvement in the delivery of transshipment-cargo railroad cars, the railroad people failed to deliver about 10,000 cars to river transport workers, which led to unproductive idle stands of the fleet equivalent to 930,000 tonnage-days.

The fleet stood idle quite a bit because of cargo-transfer equipment breakdown, particularly in the ports of Zaporozhye, Dneprodzerzhinsk, Kherson and Nikolayev.

As before, there are shortcomings in general fleet services. First of all, there is an insufficiently efficient system for supplying the fleet with fuel. Individual vessels, as the motor ship captains, comrades Simakov ("Dzhankoy"), Zhuk ("V. I. Lenin"), Batrakov ("Nikolay Krivoruchko") and others mentioned in their addresses, made port calls for bunkering up to 70 times during the shipping season, whereas, under normal organization of fleet operation and its fuel supply, these calls should not have been made in excess of 18-20 times. The harbor repair work system is unsatisfactory in many respects to river transport workers. Too little is done for improving the supply of foodstuffs and manufactured goods to the fleet.

Passenger transport has an important place in the activity of Ukrainian river transport workers. They have the modern material and technical base of the fleet and shore establishment and qualified personnel at their disposal for giving highly refined service to the population, excursionists and tourists. Many important organizational and technical measures have been implemented during the years of the five-year plan for raising the cultural level of passenger service.

Capacities have been increased and territory expanded for tourist, excursion and outing passenger carriage on the water routes due to the opening of 24 new lines, including the organization of regular foreign tourist carriage on comfortable, design 301 and 302 vessels between Dnieper and Danube ports on the Kiev-Ruse (People's Republic of Bulgaria)-Giurgiu (Socialist Republic of Romania) international tourist line.

Advance sale of tickets has been expanded, and the number of services offered to passengers in terminals and on the wharves has been increased. Guidance information and publicity work has been improved. The responsibility of dispatcher-service workers for adhering to the passenger fleet movement schedule has been increased. All of this, to a certain extent, provided for the successful fulfillment of quotas for four years of the five-year plan: 105.8 million passengers were carried, and such an index as 2.45 billion passenger-kilometers characterizes the transport production. The crews of motor ships "V. I. Lenin" (Captain, Hero of Socialist Labor comrade Zhuk), "Kometa-01" (Captain comrade Tomilin), "Meteor-28" (Captain comrade Butenko) and the collectives of the Cherkassy Terminal (Director comrade Lysenko) and the Adamovka Landing (Director comrade Kovtun) are the leaders in socialist competition for exemplary service to passengers. The crews of 106 ships, 9 terminals and 18 passenger landings were awarded the title of exemplary passenger-service collective.



The basic directions of Ukrainian river transport workers' socialist obligations for the final year of the 11th Five-Year Plan were set forth in the report of the chief of the republic's Main Administration of the River Fleet and in the speeches of Kiev Port Director M. Sements, Kiev Ship Construction and Repair Plant [SSRZ] hull technician P. Savolyuk, Zaporozhye Port crane operator I. Khokhotva, Deputy Chief of Transport and Operation Administration for the Fleet and Ports I. Kovalenko and a number of other meeting participants. In them, in keeping with the plan for economic and social development of the republic's river transport, carrying 55.5 million tons of national economic cargoes with a cargo turnover of 12.07 billion ton-kilometers in 1985, providing unconditional fulfillment of all contractual obligations for transporting cargoes and passengers during the forthcoming shipping season, achieving the fulfillment of all accepted obligations and creating a reserve for two days of operation from saved economic, fuel and other resources are specifically prescribed.

The Deputy Chairman of the UkSSR Council of Ministers K. I. Masik took part, and made a speech, in the meeting of the Main Administration of the River Fleet's collegium and the presidium of the Dnieper Basin Committee of Labor Unions for Workers of the Maritime and River Fleets [baskomflot].

The second month of 1985 has ended. On the whole, this stage of the work on fulfilling programs and obligations for the final year of the five-year plan may be considered successful for Ukrainian river transport workers. However, quite a few miscalculations, deficiencies and instances of disorganization have come to light. Not everyone proved to be ready for the difficulties presented by the severe winter. There were, and there will be, weather complications. And in places where they oppose these with organization and good management, they succeeded in developing a working tempo of high intensity from the first days and achieving good results. The socialist obligations of Ukrainian river transport workers call for precisely such difficulty-overcoming, intense work to ensure successful completion of the five-year plan and a worthy celebration of the national holidays--40th Anniversary of the Great Victory, Half-Century Jubilee of the Stakhanovite Movement--and the 27th CPSU Congress.

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## MARITIME AND RIVER FLEETS

### RECENT RIVER SHIPPING ACHIEVEMENTS IN UkSSR

Moscow RECHNOY TRANSPORT in Russian No 2, Feb 85 p 17

[Article by I. Slyusar of the Ukrainian Main Administration of the River Fleet: "Shipments Are Developing on the Dnieper"]

[Text] During the 11th Five-Year Plan, the Ukrainian river workers have been successfully carrying out the quotas for transporting national economic cargo. The shipping volumes of iron ore and iron ore raw materials have increased by 90.4 percent, metals by 49.2 percent, slag by 21.8 percent, grain cargo by 29.5 percent, building materials by 4 percent and containerized cargo by 15.2 percent.

A special place is held by cargo shipping in combined river-sea vessels. These have increased through the ports of the Dnieper, Danube and the Mediterranean Basin.

Foreign trade shipments of iron ore pellets have increased from the Poltava Mining-Processing Combine to Romania, metal to Bulgaria, Nikopol manganese ore to Yugoslavia, iron ore from Zaporozhye to the GDR and from Nikolayev via the ports of the Danube to Austria, as well as various cargo to the ports of Yugoslavia, Italy, France and Spain.

Imported cargo also arrives in the combined-trip vessels, including: metal, equipment, bauxite ore, grain, rice, flour, canned vegetables and soda ash.

Great attention is being paid to developing the shipments of food cargo, particularly grain. For this purpose, vessels are being reequipped and special transloading facilities are being established in the river ports.

The efficiency and quality of fleet operations are being increased by reducing the ballast runs of the vessels, shortening their stays for processing in the ports, employing highly productive transloading machines and progressive methods, introducing progressive fleet operation methods, extending the navigation season in the early spring and late autumn, organizing cargo shipments by the local fleet on certain sections in the winter, and delivering to the fleet ice breakers and vessels designed to operate under ice conditions.

The great, intense work by the collectives of our ports has contributed largely to the successful carrying out of the quotas of the five-year plan. The cargo

Cargo handling plan has been fulfilled by 101.5 percent. In comparison with the level achieved in 1980, the volume of cargo handling has risen by 5.8 percent.

In order to fulfill the quotas of the five-year plan for labor productivity and the saving of fuel and energy resources, there are plans to increase the amount of shipments in large-tonnage vessels and consists.

In recent years, the Ukrainian transport fleet has changed substantially. The share of large-tonnage diesel vessels with a tonnage of 1,800, 3,000 and 5,000 tons and nonself-propelled vessels with a tonnage of 1,500 and 2,100 tons has risen.

The construction of a large-tonnage transport fleet requires a sharp rise in the intensity of cargo handling. The ports of Chernigov, Cherkassy, Dnepropetrovsk, Zaporozhye, Novaya Kakhovka, Kherson and Nikolayev have been newly built or expanded. In line with the increased volume of foreign trade shipments, new berths have been created: at the Zaporozhye Port to unload imported equipment and metal from the "river-sea" combined vessels; at the Kherson port to load vessels with the Nikopol manganese ore traveling to Yugoslavia. The Dnepropetrovsk port has built a berth for processing metal for Bulgaria and an automatic facility for high-speed loading of railway cars and motor transport with a productivity of 8,000 tons per hour; the Kiev, Cherkassy and Dnepropetrovsk Ports have established facilities for unloading grain from the vessels using portal cranes.

During the 11th Five-Year Plan, the ports will build and reconstruct more than 1 km of cargo berths and this will make it possible to increase the length of the berth front by 11 percent. The ports will receive 28 portal cranes with a lifting capacity of 10-16 tons, 10 floating cranes, and 7 hydraulic sand loaders with a productivity of 900 m<sup>3</sup> per hour. Construction is being completed by the Kiev Port in collaboration with the Dnepropetrovsk Port of a rotary-conveyor unloader with a productivity of 1,000 tons per hour.

Testing is being run on a prototype pneumatic machine for cleaning railway cars at the Dnepropetrovsk Port. The container fleet is being modernized and 2,000 metal containers are being put into use. This will make it possible to significantly increase container shipments. The port will receive 20,000 pallets.

In line with the introduction of mechanization to clean the vessels of the remnants of bulk cargo and to handle crated piece cargo, there was a sharp decline in the employment of heavy manual labor.

The carrying out of all the designated measures has made it possible for the ports over the years of the five-year plan to process 3.7 million tons of cargo above the plan, to reduce the time standard for processing tonnage by 10.4 percent and reduce railway car stoppages by 9.6 percent in comparison with the plan.

The Ukrainian ports employ 115 integrated brigades, including 37 start-to-finish consolidated ones. The Kiev, Dnepropetrovsk and Zaporozhye Ports have achieved good results in developing the brigade forms of organizing and encouraging labor in cargo handling operations. Here all brigades work according to unified

schedule orders. Fifty-five collectives have organized brigade and brigadeer councils. In the struggle to increase the efficient use of the rolling stock of all types of transport and accelerate the delivery of national economic freight, the socialist competition has played a major role. In the eight transshipment centers of the basin they have organized a comprehensive socialist competition of the enterprises and organizations of river, rail and motor transport.

The competition of cooperating enterprises in the transshipment center has been organized on the basis of concluded contracts and joint socialist obligations accepted by the cooperating enterprises. Each quarter the results are summed up and prizes are awarded.

The work of the transshipment centers is carried out according to a uniform shift-daily plan compiled by the representatives of the port, the railroad station and the motor transport department for the centralized receipt (dispatch) of freight. The smooth cooperation of the river workers, sailors, railroad workers and motor vehicle operators in 1984 made it possible for the Ukrainian Glavrechflot [Main Administration of the River Fleet] to ship 1.4 million tons above the plan, reduce fleet stoppages by 9.5 percent in comparison with the plan and for railway cars by 13.6 percent.

The winners in the socialist competition in their transshipment centers during the 1984 navigation season were: during the first quarter--the Kremenchug and Nikolayev Ports which won second place, and Kiev in third place; in the second quarter the Zaporozhye Port imeni Lenin was in first place, the Kremenchug in second and Kiev in third.

Along with this there have been a number of substantial shortcomings in the operation of the transshipment centers. There has not been a steady delivery of railroad cars, vessels and motor transport to the transloading points. As a result, 1.5 million tons of national economic freight has accumulated at the port berths. The ports are not yet sufficiently equipped with continuous-operation machines and cleaning equipment. The large-tonnage vessels cannot be handled at all berths under optimum conditions (with two or three cranes).

One of the factors which impedes the port operations is the poor development of the preport stations and the internal port rail lines.

The development level of the client piers also lags substantially behind today's equipment, particularly those of the Ukrainian Ministry of Procurement where vessels are processed with a low productivity of 30 tons an hour. The Ukrainian Ministry of Ferrous Metallurgy should have built berths for receiving metallurgical raw materials and dispatching products with a total cargo turnover of more than 9 million tons at the metallurgical plants in Dneprodzerzhinsk, Dnepropetrovsk and Zaporozhye. Construction of these berths has not yet commenced.

The elimination of these shortcomings will help to increase the efficiency and quality of operations in the transshipment centers.

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## MARITIME AND RIVER FLEETS

### OFFICIAL ON YENISEY BASIN SHIPPING PROBLEMS

Moscow VODNYI TRANSPORT in Russian 14 Feb 85 pp 1-2

[Article by L. Sizov, second secretary of the Krasnoyarsk Kraykom and deputy of the RSFSR Supreme Soviet, in the column "From Congress to Congress": "The Yenisey Complex"]

[Text] The Yenisey is the only river in Siberia on which year-round navigation is conducted. A transportation conveyor, which links the Norilsk Mining and Metallurgical Combine with many industrial centers of the country, is operating in the high latitudes of the Arctic and the Transpolar area. During severe frost and bad weather, seagoing vessels force their way in the ice of polar seas and the Siberian river to deliver hundreds of thousands of tons of national economic cargo to the Dudinka Port. From there they haul away ore and the production of the transpolar metallurgists.

The conducting of such navigation is provided for by the decisions of the 26th Party Congress. In the "Basic Directions of Economic and Social Development of the USSR for 1981-85 and the Period up to 1990" it is written: "To ensure year-round navigation in the Western part of the Northern Sea Route and timely delivery of necessary cargoes to regions of the Far North..." This important task of the Communist Party is being successfully fulfilled by the Ministry of the Maritime Fleet, its subdivisions and the collective of the Norilsk Mining and Metallurgical Combine.

During the past several years, new types of icebreaker-transport vessels of large carrying capacity have appeared. Working with confidence in the Arctic are crews of the nuclear ships "Lenin," "Leonid Brezhnev" and "Sibir'." Together with other icebreakers they guide convoys with cargoes during very difficult ice conditions in the Kara Sea and on the Yenisey River. Up to 2.5 million t of cargoes are now being delivered and hauled from Dudinka by seamen annually.

Largely as a result of the year-round navigation, the Norilsk Combine began to regularly and promptly receive the equipment and materials which are needed for work and development of the enterprise and the normal life of the city near the 69th parallel. But this is not all.

It is very important that the seamen are for the most part providing reliably for the needs of transpolar metallurgists. The industrial bridge that extends

from Norilsk to the Kola Peninsula is operating steadily. The Severonikel' and Pechenganikel' Combines receive converter matte and ore from here for the steady work pace of their collectives.

There has been much innovation on the Western sector of Sevmorput' [Northern Sea Route] during the course of year-round navigations. Tasks, which had no parallel in world practice, are being solved. A great contribution to this is being made by the Murmansk and Northern Shipping Companies, their ports and port workers of Dudinka. The Krasnoyarsk Kraykom attentively follows the development of year-round navigations and renders serious assistance to collectives in overcoming difficulties and solving problems of which there are still many. We are striving to strengthen the creative cooperation of fellow transport workers--seamen, port workers and transpolar metallurgists--and are coordinating their activity in many directions. The task has now been set to ensure operation of the entire transportation conveyor in the Arctic according to timetable, according to precise and coordinated schedules. This will make it possible to reduce expenditures for conducting year-round navigations and to make them more reliable and stable.

A large complex of measures in this direction was worked out jointly with the Ministry of the Maritime Fleet, the Ministry of Nonferrous Metallurgy and the Norilsk Combine. Modernization and reequipment of the Dudinka Port and the railway that links Norilsk with Dudinka is planned. Construction has to be completed of a motor road in the tundra and of an oil berth for seagoing vessels and a lot has to be done for containerization and packaging of cargoes. The capacities of the Murmansk and Arkhangelsk Ports are being expanded for this purpose. We hope that party organizations of their collectives will assume control over work on important projects and help to ensure timely commissioning of warehouse complexes and approach lines.

Rivermen are also actively participating in solving the national economic tasks in the kray. They are now making preparations for the 1985 navigation season in the immense territory of the Yenisey basin. The fleet, cranes and other equipment are being repaired at plants, REB [repair and operations bases] and in ports and accumulation of cargoes is being continued. Although in the past few years a part of shipments to the North was assumed by seamen, the Yenisey River Shipping Company delivers to the Dudinka Port and hauls from there millions of tons of cargoes, and the volume of shipments continues to grow.

Many permanent lines, which link the Far North with Krasnoyarsk and Lesosibirsk Ports, are operating in a stable manner, according to schedule. The quality of shipments has improved. The delivery of cargoes in containers and packets was introduced, and fleet processing periods are being reduced. The kraykom attaches great significance to innovation, improvement of the transportation process and raising its efficiency. These questions are constantly in the field of vision of party organizations.

Supervisors of the Norilsk Combine and the Yenisey River Shipping Company are now solving serious problems with respect to changing cargo flows and hauling new kinds of production. According to an assignment of the USSR Gosplan, the Yenisey rivermen are to haul up to 200,000 t of new cargoes already this year.

There are quite a lot of difficulties here. For example, lump sulfur is hauled by ships in bulk, which is somewhat dangerous for crews and the people who process it in port. Krasnoyarsk Port workers unload according to the direct vessel-railcar method and spend up to 10 days to process a motorship. It is clear to everyone that such production must be delivered in containers; there is already experience in this. But so far the shipping company and the consignee have not combined their efforts in this matter, and ministries are also not providing them assistance in solving the problem.

During the past few years, a part of bulk oil shipments was transferred from river to sea. Its steady shipment was ensured over a 1-year period. But now an oil refinery is operating in the kray, in Achinsk, and it is switching to production of various grades of fuel.

Therefore, it is now expedient to concentrate shipments of bulk oil in the hands of rivermen. It is true that its distribution in Dudinka and Norilsk is an obstacle which is by no means unimportant. In 3 months it is necessary to haul hundreds of thousands of tons of bulk oil, pump it from tankers and transfer it to the Norilsk area. The rivermen are entirely capable of handling such volumes, but the combine's railway will be unable to ensure their hauling within a short period. The capacities of the pumping station are also insufficient. The task is difficult, but it must be solved; perhaps it is expedient to lay an oil pipeline. The national economy must not sustain losses because of inefficient shipments.

Over a period of several years, the Yenisey River Shipping Company was unable to cope with fulfillment of its cargo delivery plans. There were quite a lot of reasons. There were miscalculations in planning and in organization of operations of the fleet, ports and industrial enterprises.

The kraykom closely analyzed the shipping company's activity and together with Minrechflot [Ministry of the River Fleet] adopted measures to eliminate shortcomings. A lot of work in this direction was conducted by party organizations. The Yenisey rivermen fulfilled their tasks in the 1984 navigation season. The plan for shipment of cargoes was fulfilled for tons by 102.6 percent and for cargo turnover by 105.2 percent. Labor productivity was increased by 5.6 percent and production cost was reduced by 2.1 percent.

The collective of the shipping company still has many reserves which are not being used. There is no strong linkup of transportation links. A detachment of Yenisey rivermen are working today on these and other questions. But the kraykom is disturbed by the circumstance that some problems facing the shipping company and its subdivisions have not been solved for a long time or are solved very slowly, which affects their activity.

In our opinion, the Ministry of the River Fleet has relaxed its attention to questions of water transport development in Krasnoyarsk Kray, although it plays a very important role in the formation of productive forces in one of the country's largest regions. Concern about the situation was expressed by communists at party accountability meetings which were held in the latter part of 1984.



Five years ago, a joint decision of the kraykom buro, the executive committee of the kray soviet and the collegium of MRF [Ministry of the River Fleet] was adopted on measures aimed at developing the river fleet in the kray and strengthening its material and technical base. A complex of measures was jointly outlined and a concrete program of actions was confirmed.

A few years later, the Ministry of the River Fleet adjusted the outlined program, and some extremely important points were either dropped from it completely or postponed to an indefinite long-term. For example, it was planned to spend R83.4 million on construction, expansion and modernization of enterprises, but only R59 million were allocated.

The Podtesovo Fleet Repair and Operations Base is one of the sector's largest bases for settling and repair of vessels. But this enterprise with extremely outdated production has not been developed for the past 10 years. Little living space and few social and cultural facilities were built.

Up to 500 people leave here annually and vessels remain in the backwater during navigation season because of inadequate staffing of crews. The Ministry of the River Fleet has organized in Podtesovo a special detachment of Podvodrechnostroy [Underwater Technical and Construction Work Administration] for construction of industrial and housing projects. But its collective has done very little and is not coping with its plans. Measures to improve the activity of construction workers have not been adopted so far, they need assistance. The situation is changing now, the Ministry of the River Fleet has allocated R29 million for the development of the repair and operations base and the settlement. Assimilation of these funds is too much for one detachment of the Underwater Technical and Construction Work Administration. Obviously, the Krasnoyarsktransstroy Trust [not further identified], which has completed construction of the Lesosibirsk Port, should transfer SMP [construction and installation train]-230 to Podtesovo and begin construction of projects of the fleet repair and operations base in earnest.

The Krasnoyarsk SRZ [Ship Repair Yard] recently marked its 75th anniversary. For 8 years modernization at the enterprise has been conducted for the most part by using capital repair funds. Shells of new buildings appeared on its territory, then the work slowed down. Virtually no capital investments were allocated for the current year and key problems of modernization are not being solved--there is no contractor, plans are becoming outdated and they are not tied in with each other.

The time has come for retooling steel and iron foundries, finishing construction of the berths and piers and the slip and modernizing engineering networks. Installation organizations should be connected to this work, but there are not enough funds and equipment. In our opinion, the Ministry of the River Fleet can render assistance to the yard collective so that it feels the effect of modernization in the time immediately ahead.

There are quite a lot of unsolved questions, which were dropped from the jointly adopted program for the development of river transportation in the kray. In particular, it is unknown when the planning and construction of the Berezovskiy



Ship Repair Yard will begin. There is a sharp need for it. There is also a need for an educational base of the Krasnoyarsk River School. Nearly R3 million have already been spent on site preparation and tearing down of buildings for its construction. Capital investments for the construction of the school's educational base are not being allocated and the work has stopped. It may happen that the site will be turned over to another department. It is extremely important to begin construction in the immediate future of the SGPTU-2 [not further identified] educational building and a dormitory for it and GPTU [city vocational and technical school] in Podtesovo. Without developing these educational institutions it is impossible to solve the problem of personnel for the fleet and enterprises of the shipping company.

The kraykom is disturbed by the fact that the Yenisey River Shipping Company has been reducing shipments of timber cargoes over the past several years. During the years of the current five-year plan alone, the average annual volumes of hauling timber by rafts and ships were reduced by more than 1 million m<sup>3</sup>. This has put many consumers in and outside the kray in a most difficult position and led to reduction in the volumes of lumber and railroad tie production. The main reasons why this situation has developed are a shortage of tugboat and auxiliary fleet, command and rank and file personnel and oversights in the organization of labor and in maintenance of shore and navigation conditions on the Angara.

At the present time the situation has become even more complicated. In connection with the construction of the Boguchany GES, it is necessary to additionally haul up to 2 million m<sup>3</sup> of Angara timber annually from the flooding zone. Effective assistance to the shipping company is necessary for stable operations of the kray's timber industry complex and to ensure increased volumes of timber hauling, there is a need to replenish its fleet with tugboats and auxiliary vessels and to assign graduates of the sector's educational institutions here to bring up the crews of raft operators to full strength. It is also necessary to conduct dredging in the shallow and capricious Angara and to replenish the transport fleet, which is worn-out and obsolete.

Our kray has accumulated certain experience in combining efforts of party organizations and related collectives for solving a specific task. The timber navigation season can serve as an example of such approach. Every year the kraykom together with the Ministry of the Maritime Fleet, the Ministry of the River Fleet, Minvneshtorg [Ministry of Foreign Trade] and Minlesbumprom [Ministry of the Timber, Pulp and Paper, and Wood Processing Industry] outlines and implements a complex of measures, which help in achieving the goal. The most acute problems which prevent partners from reaching the final results are being solved at the same time. This is promoted to a great extent by the work of coordination groups of the Lesosibirsk and Igarka gorkoms and the kraykom's navigation staff. As a result, the planned quantity of lumber is shipped to many countries in the world year after year.

Our kray recently marked a great event--its golden anniversary and awarding to it of the Order of October Revolution in this connection. Comrade K. U. Chernenko's greeting to workers of Krasnoyarsk Kray has aroused particular enthusiasm. The kray was honored with the third highest award for accelerated

development of productive forces. I must note the great contribution to this by Yenisey rivermen, who provide all sectors of the national economy with necessary cargoes, and we are grateful to them for good work.

The collective of the Yenisey River Shipping Company is now making preparations for the 1985 navigation season. Competition is expanding among rivermen for a fitting welcome to the 27th CPSU Congress, they have assumed shock duties in honor of the 40th anniversary of the Great Victory and under the supervision of party organizations are working on successful fulfillment of the five-year plan tasks. Crews of vessels and collectives of shops and sectors have launched a campaign for thrift and economy and have decided to work 2 days on economized fuel and materials.

We hope that the Ministry of the River Fleet will find possibilities to render assistance to the Yenisey River Shipping Company in developing and strengthening its material and technical base. The water transportation complex must operate at a regular tempo and ensure the increasing cargo shipments in Krasnoyarsk Kray.

9817

CSO: 1829/220

## MARITIME AND RIVER FLEETS

### LIGHTER CARRIER 'BORIS POLEVOY' PROFILED

Moscow MORSKOY FLOT in Russian No 3, Mar 85 pp 42-45

[Article by Ye. Velyakov: "The Lighter Carrier 'Boris Polevoy'"]

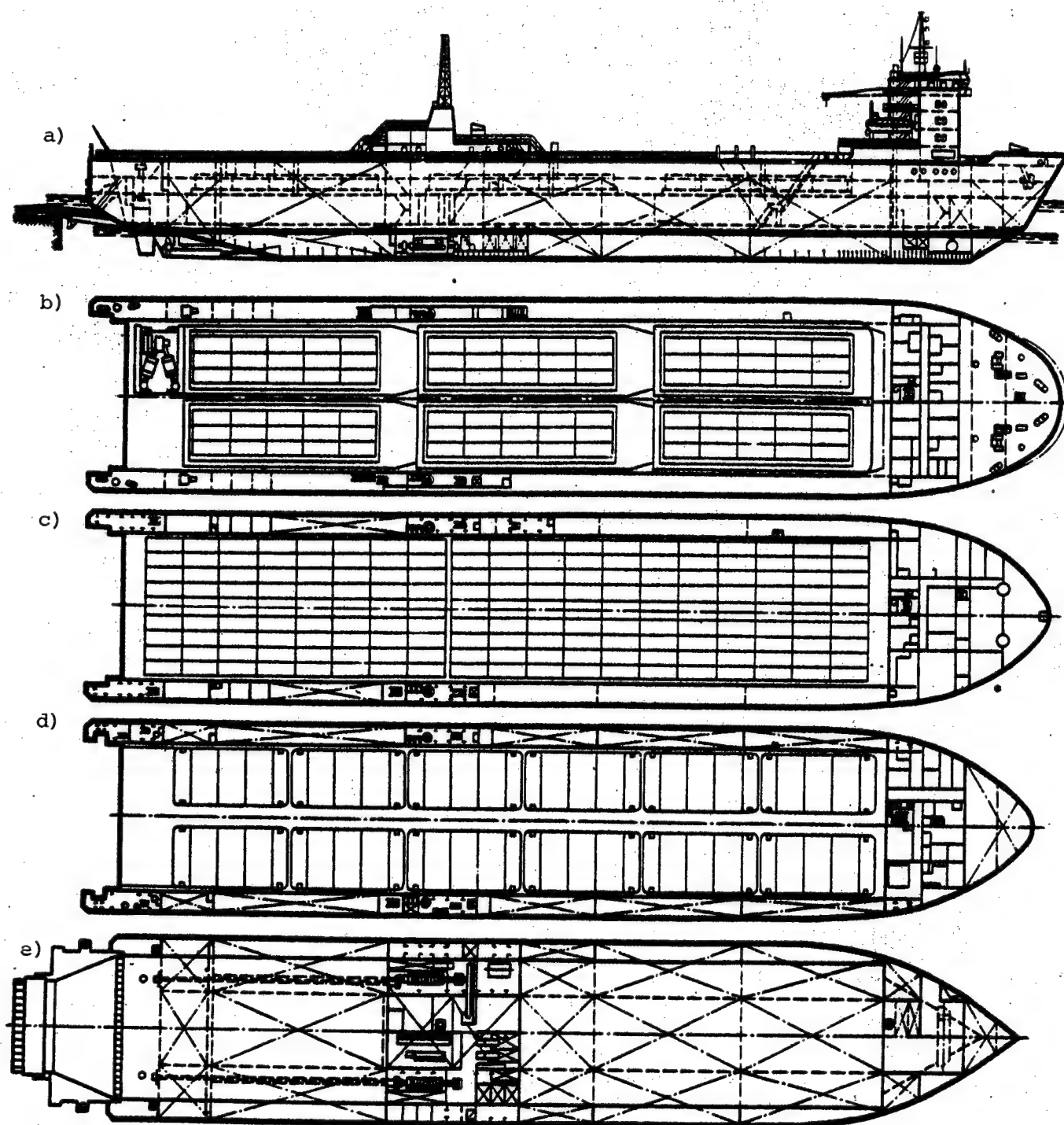
[Text] In May 1984, the Helsinki Shipyard of the Valmet Corporation (Finland) delivered a new class of ship to the Soviet Danube Shipping Company--the Boris Polevoy multipurpose feeder lighter carrier. Another unique motorship, the Pavel Antokol'skiy, was built in September of last year. The term "Feeder" simply means "distributor" or "collector." This means that a ship with relatively small displacement (in this case with a deadweight of about 8,800 tons) joins the lighter carrier system and is intended to distribute lighters delivered to the basin's base port by large line lighter carriers (e.g. the Yulius Fuchik, with deadweight of about 38,000 tons) to basin receiving ports. The feeder lighter carrier also collects loaded lighters at ports of origin and delivers them to the home port for loading onto a line lighter carrier and shipment to the port of destination.

The motorship Boris Polevoy is intended for use as part of the Interlighter lighter carrier system, which is an international commercial enterprise operated jointly by shipping companies of the USSR, Bulgaria, Hungary and Czechoslovakia. The Soviet Danube Shipping Company uses the motorships Anatoliy Zheleznyakov and Nikolay Markin, built in Italy, as feeder transport. These are similar in class and dimensions to the Boris Polevoy.

Boris Polevoy-class lighter carriers are multipurpose, i.e. they are intended to transport a variety of cargoes. Their basic purpose is to carry six Danube--sea combined shipping type lighters or 12 LASH-type lighters. In addition, the lighter carrier can transport international containers: 513 20-foot units or 243 40-foot units, trailers, other vehicles, as well as lumber and general cargo.

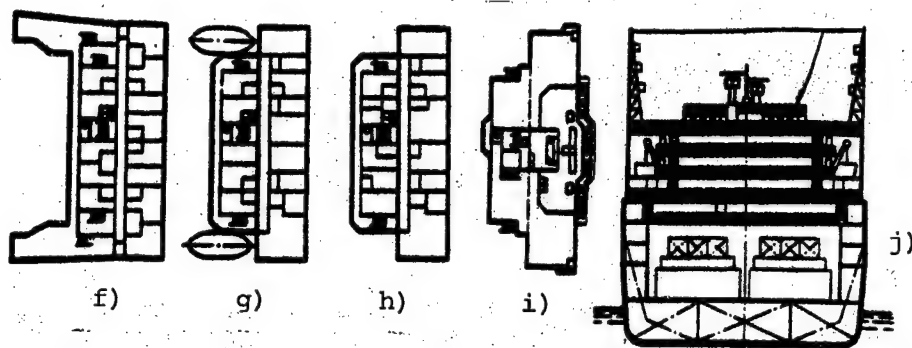
Boris Polevoy-class motorships are "open, dock" type vessels. Lighters are loaded onto the ship afloat. The cargo hold, completely open at the top, has no hatch covers, and the stern part of the cargo hold has a combined ramp-port which opens the hold to bring lighters afloat and to load and unload vehicular cargo. To load lighters, the ship is ballasted with seawater to a 9.3-m draft. Lighters are brought to the cargo hold entry by a special pusher tug which is also carried on board the ship and is

included in the lighter carrier's scope of supply. It is able to load lighters afloat in waves to 1 meter and if there is no current in the loading area. Time to bring aboard one lighter ranges from 10 to 20 minutes.



Lighter carrier Anatoliy Zheleznyakov, built in Italy according to a design similar to that of the Boris Polevoy.

General ship arrangement: a) Side view, longitudinal section; b) Upper deck; c) Second deck; d) Third deck; e) Fourth (main) deck.



General ship arrangement (cont): f) First side deck; g) Second side deck; h) Third side deck; i) Command deck (navigation bridge); j) Cross section.

The ship is built to class KM\*L3 1A2 of the Registry of the USSR and has limited operating area. There are 43 places for crew and pilot. The ship's design takes into account requirements of international conventions and regulations, as well as regulations and standards current in the USSR covering ships of this class. The ship has two screws with bow rudder gear, engine room in the stern under the cargo deck, and a superstructure which holds living and service area in the bow.

Since lighters are loaded and unloaded with the ship in ballast, special measures were taken during ship design to ensure minimum depth to the main cargo deck and minimum draft in ballast. As a result, the ship has the smallest draft of an "open, dock" ship.

The cargo hold (U-shaped) is 124.7 meters long and 22.9 meters wide. The stern ramp for loading vehicles also serves as a watertight hold cover when raised. This combined gear was developed by McGregor-Navire Company. It is 12 meters long (not including the support section), its traveling portion is 15 meters wide, and the permissible load on the ramp is 440 tons. The ramp exerts pressure up to 2 tons-force/m<sup>2</sup> on the berth. It can operate at ship list to 2° and at an angle to ±8°. The ramp permits loading and unloading cargo onto wharves 1 meter higher than the cargo (main) deck, or 2.3 meters below it. The ramp is raised and lowered by hydraulic winches controlled from the control station on the upper deck in the stern of the ship. This station controls the hydraulic gear which battens down the stern doors. The ramp is also fitted with ice-rated hydraulic cylinders.

Lighters are brought to the ship's hold with a 440-kW shipboard pusher tug fitted for operation on rivers and in ports and built for class KM\*III (pusher) of the Registry of the USSR. The tug is fitted with two screw-rudders with 220-kW diesel engines. The rotating screw-rudders provide approximately 6 tons-force of tractive force and good maneuvering qualities for a tug-barge system. The tug is controlled remotely from the wheel house with adjustable placement height. The tug is lashed to the lighters by ropes tightened by hydraulic cylinders. Rubberized vertical rollers are provided at the entry to the cargo hold at the level of the side fenders.

The system for delivering and removing lighters has eight electrohydraulic hauling winches (two for each corner of the cargo hold) with tractive force adjustable from 0.5 to 8.0 tons-force, located on the upper deck. The winches are joined in pairs to four trolley-type transporters (two per side) which move along guiderails set into the inner longitudinal cargo head bulkheads.

The transporters move so that one transporter pulls a barge while the other slows it. This ensures smooth and reliable control of barge movement along the side fender built into the longitudinal cargo hold bulkhead. The system makes it possible to bring up two lighters simultaneously. Maximum winch tractive force is 8 tons-force. There are special winches (12 units on each side) on the upper deck to position the lighters when the ship has been deballasted. Winches are hydraulic and automatic, and work similarly to mooring winches. Winch tractive force is 2 or 4 tons-force. They are controlled from six control panels. There are independent hydraulic assemblies for pulling and setting winches on each side. The hydraulic assemblies are located at the ship's stern.

When the lighters are being delivered, the pusher tug brings them 6 meters from the edge of the cargo deck, where they are attached to the transporters with special ropes which run to lighter cleats. To fit Danube--sea lighters, their keel stops enter into special longitudinal troughs on the main deck. When other cargoes are being transported, these troughs are closed by sliding covers flush-mounted in the deck. To set and position LASH-type lighters, a special seat, with corresponding attachments, is welded into the deck.

Containers must be loaded onto the ship by port cranes. The main deck has seats appropriate for setting 20- and 40-foot containers. The main deck also has welded-in seats for attaching trailers and other vehicles.

The Boris Polevoy is a two-screw ship with two Wärtsilä Waasa 9R32 four-stroke diesels with turbocharging and intermediate cooling, which run on heavy fuel. Maximum long-term output by each engine is 2.78 MW (3780 hp) at 750 rpm. The engines operate through single-stage reducing gears with elastic couplings. The variable pitch propellers are bronze, with four blades. Heavy fuel consumption by the main engine at maximum long-term output is about 28 tons/day.

#### Characteristics of Lighters Carried on the Ship

<u>Characteristic</u>	<u>Danube--sea</u>	<u>LASH</u>
Length, meters	38.25	18.75
Width, meters	11.0	9.5
Draft, meters	3.36	2.75
Carrying capacity (grain), m <sup>3</sup>	1265	570
Deadweight, tons	1070	380
Total weight, tons	1300	465

The electric power station consists of two 840-kW shaft generators and two 400-kW diesel generators. The backup diesel generator has a 100-kW capacity. Ship speed is provided by one diesel generator or shaft generator. Cargo handling operations with lighters are powered by two diesel generators. The rudder gear operates only from the shaft generator. The ship's power plant is controlled by a remote automated system from the wheel house when the engine room is unattended or from the central control station. The remote automated control system for the main engine/variable-pitch propeller was produced by Stromberg.

Taking on and discharging ballast are controlled from the central control station, as well as from a special ballast system control panel in the superstructure with a good view of the cargo holds. The ballast system is served by two 1500 m<sup>3</sup>/hour centrifugal pumps. Ballast can be taken on and discharged with the stern ramp covered. The ballast system ensures that the ship can be ballasted and submerged to a 9.3-meter draft in 5 hours, and that ballast can be discharged and the ship raised to a 4.3-meter draft in 7.5 hours.

The boiler plant consists of one 3-ton/hour backup boiler run on heavy fuel and two 1.5-ton/hour recovery boilers at a pressure of 7 kg/cm<sup>2</sup>.

The ship has a 590-kW bow rudder gear which provides traction up to 8 tons. The stern tube runs on lubricating oil with "Sederwall" seals. The lighter-carrier has a biological waste processor, oily water separator, incinerator, and water distiller and degreaser.

The ship is equipped with radio communication and electroradio navigation equipment, primarily of domestic manufacture.

Living and public spaces have modern decor and equipment and are air conditioned. The crew has 32 single cabins, 10 of which are equipped with an additional Pullman-type bunk. The seven members of the senior officers' staff have unitized cabins. The crew has a complex of public spaces including wardroom, dining room, lounge, as well as a hobby shop, library, gymnasium, sauna/steam bath, and swimming pool. The required medical areas with appropriate equipment are provided.

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## MARITIME AND RIVER FLEETS

### RO-RO 'KOMPOZITOR KARA KARAYEV' PROFILED

Moscow MORSKOY FLOT in Russian No 4, Apr 85 pp 44-47

[Article by G. Terent'yev (Mortekhsudoremprom All-Union Association) and A. Shtepa (Sudoimport All-Union Association): "The Ro-Ro 'Kompozitor Kara Karayev']

[Text] The prototype vessel of a new series of ro-ro's--the motorship "Kompozitor Kara Karayev"--has been built at the "Neptun" yard (GDR) and turned over to the Ministry of the Maritime Fleet. The vessel is designed to transport various wheeled and caterpillar track equipment with fuel in the tanks, trailers, cargoes on pallets, flats and roll-trailers, as well as international standard containers, including refrigerated. It can be used for operation on inland and open seas with the distance from the harbor up to 200 miles and on navigable river lanes.

The vessel was built for class of the Register of Shipping of the USSR KM Ⓢ L3 1 A2 (trailer) and is a double-deck, twin screw vessel with superstructure located in the bow section, with a bulbous bow and catamaran stern, with a bow steering system and diesel power unit located at the stern of the vessel.

The dimensions and contours of the hull were chosen in consideration of ensuring good seaworthy and maneuvering qualities of the vessel, based on the possibility of navigating along river shipping lanes. The stability of the vessel corresponds to the requirements of the Regulations of the Register of Shipping of the USSR for restricted area of navigation 1 independent of the ship load.

The all-welded hull of the vessel was assembled according to a combined system: the double-bottom, main and upper decks--along the longitudinal system, and the rest of the hull--along the transverse, and there are hull reinforcements for ice for class L3 of the Register of Shipping of the USSR. The vessel has two cast-welded sternposts, a stempost in the area of the bow bulb was made squared and in the upper part--of sheet metal. Grade 09G2 and VM3 sp were used as the hull material. The five main transverse bulkheads divide the vessel into six watertight compartments. The double bottom extends from the stern bulkhead of the engine room to the collision bulkhead, and has a varying height of from 1000 to 2400 mm. Both decks at the stern, one-third the length of the vessel, are horizontal without camber and sheer; a break is made in them in the area of the 63rd frame, and the height above them of the main lines is



gradually reduced by 1500 mm; after the 109th frame the main deck is again horizontal; the upper deck, from the 119th frame to the 160th frame is horizontal, and from the 160th frame to the bow has a rise of 250 mm. The deck structure with a break in level made it possible to accommodate in the bow section of the vessel a two-tier superstructure, and to ensure at the same time the possibility of the vessel's passing under bridges (18.4 meters from the basic line). The strength of the hull makes it possible to transport cargoes with the following permissible loads: flooring of the double bottom-- $29.4 \text{ kN/m}^2$  (3.0 ton-forces/ $\text{m}^2$ ), main deck-- $29.4 \text{ kN/m}^2$  (3.0 ton-forces/ $\text{m}^2$ ), upper deck-- $19.6 \text{ kN/m}^2$  (2.0 ton-forces/ $\text{m}^2$ ).

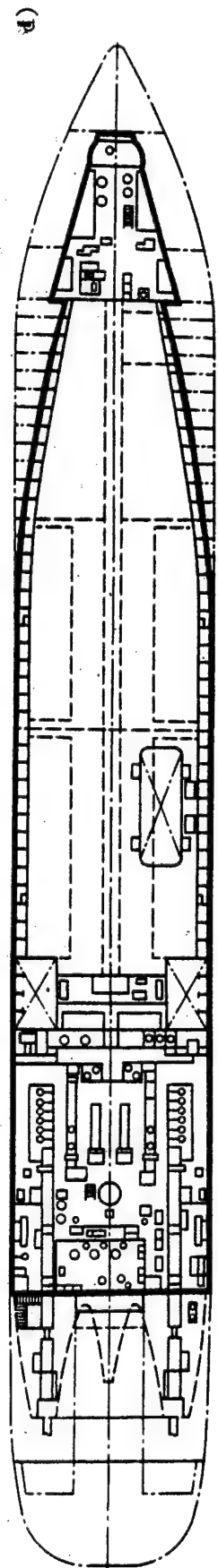
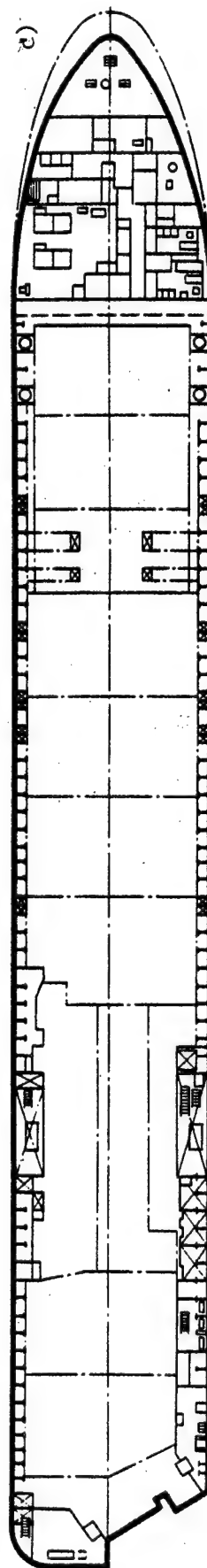
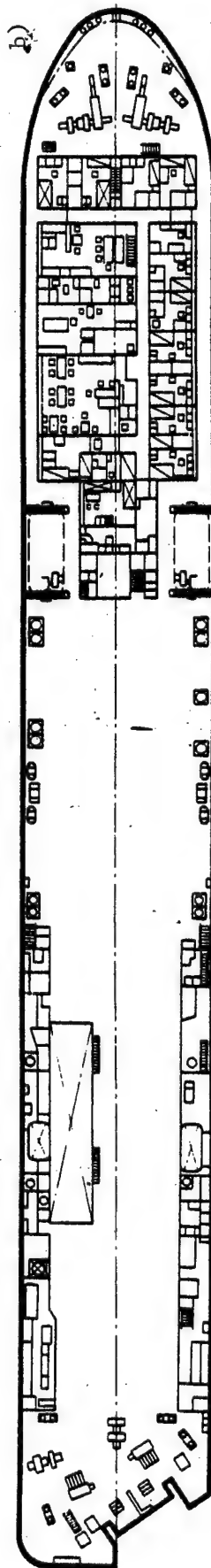
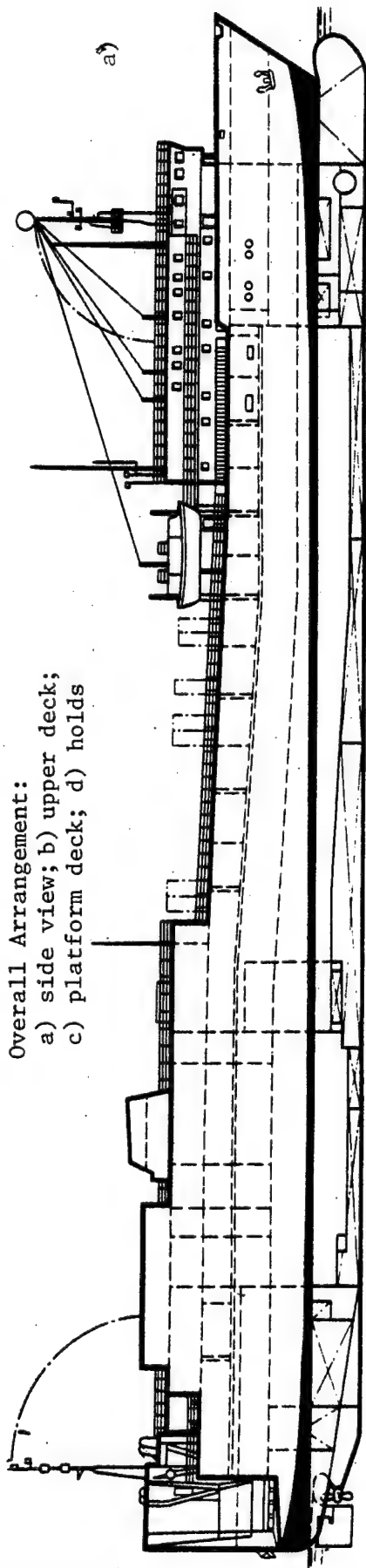
The vessel's cargo turnover is made at its mooring, from the starboard side or stern through the stern ramp, placed at the starboard side at the level of the main (lower) deck at an angle of  $35^\circ$  to the centerline. The three-section angular ramp with hydraulic drive and automated ramp winches has the following basic specifications: lane length 20.5 meters, width 5.5 m, clearance height at the stern exit port 5.0 m, incline angle of the lane  $\pm 8^\circ$ , maximal permissible heel of the vessel in loading  $\pm 5^\circ$ , trim  $\pm 1^\circ$ , load on the ramp  $550 \text{ kN/m}^2$  (55 ton-forces/ $\text{m}^2$ ) load at the berth under an automated system  $20 \text{ kN/m}^2$  (2 ton-forces/ $\text{m}^2$ ) with the suspension cables  $32 \text{ kN/m}^2$  (3.2 ton-forces/ $\text{m}^2$ ), vessel's standing-off from the berth 0.8-1.2 m. Loading can be carried out when berth height is from 1.5 to 4.0 m. During loading operations, the change in the position of the ramps, depending on the change in the draft of the ship, is carried out automatically.

The cargo is distributed from the main deck into the lower hold with the aid of a hoisting platform with a load-lifting capacity of 40 tons, and onto the open upper deck--with the aid of another hoisting platform with a load-lifting capacity of 45 tons. Both hoisting platforms are driven by means of hydraulic cable traction.

Along the entire length of the tween-deck, under the upper deck, there is a suspended motor vehicle platform, on which only passenger vehicles can be transported. This platform consists of 10 separate sections, each of which can be raised or lowered independently of the other sections by means of hydraulically driven cable traction. Unloaded, the motor vehicle platform is raised under the upper deck itself, maintaining a clearance height in the tween-decks of 4500 mm. When transporting motor vehicles, the platform is lowered 1700 mm. Part of section No 8 is made in the shape of an entry slope with an incline of about  $12^\circ$  and a width of 2.2 m, and passenger vehicles are transported along it. This section, under a load, can be raised to a horizontal position and checked. The permissible load for all sections of the motor vehicle platform is  $2.5 \text{ kN/m}^2$  (0.25 ton-forces/ $\text{m}^2$ ).

There is a hydraulically driven cover flush-mounted with the main deck to make the closure of the well in the main deck in the area of the hoisting platform leading to the hold watertight. The cover is calculated for a load equal to the load on the main deck. There is a special system to level off the tilt and reduce it during loading operations. The system operation and anti-tilt conditions are monitored from the loading operations control station and central control station.

Overall Arrangement:  
a) side view; b) upper deck;  
c) platform deck; d) holds



The cargo facilities are equipped with forced and exhaust ventilation, ensuring 20-fold air interchange during the loading operations, and in passage, 10-fold. The ventilation ducts are provided with hydraulic flaps, and the ventilators are controlled from the wheelhouse and from the cargo operations control center.

The vessel has two semi-balanced rudders with rudder angles on port and starboard of 45° each. Both rudders are driven by a single electro-hydraulic rudder mechanism placed on the port side. The rudder mechanism has two dual-action hydraulic cylinders, the piston rods of which are joined with the tiller. The power is transmitted to both rudder head shafts through the traction mechanism.

Installed in the vessel's bow is the steering assembly, equipped with a four-blade variable pitch propeller with hydraulic pitch change. The assembly is actuated by a 370 kw electric motor and forms a thrust of 55 kN (5 ton-forces). The assembly is actuated and is controlled from the wheelhouse and the central control panel.

The anchor assembly consists of two bow stockless anchors, each with a mass of 3060 kg, of the Gruzon type with 49 mm gage welded anchor chains, each 250 m long. The anchors are worked by two combined horizontal electric berthing hawser winches with a pulling force at the sprocket of 114 kN (11.4 ton-forces). The bow anchors can be operated by remote control from the wheelhouse. The stern anchor assembly, consisting of one stockless anchor of the Gruzon type, with a mass of 1590 kg and a chain, gage 34 mm and 100 m long, serves to ensure navigational safety along navigable river lanes. The anchor can be operated by an electric capstan with a tractive force of 50 kN (5 ton-forces).

The life-saving apparatus consists of two motorized life boats made of glass-reinforced plastic, for 46 persons each, and four inflatable life rafts with a capacity of 16 persons, and fully meets the requirements of the SOLAS-74 Convention.

The superstructure for the quarters located in the vessel's bow, is equipped with living facilities for the crew: 13 single cabins for the commissioned staff, 6 double cabins for the non-rated personnel, 4 four-berth cabins as spare spaces and a single-berth cabin for the pilot. In addition to the living quarters, other facilities are equipped for crew, necessary for everyday life and good relaxation, including a gymnasium and a sauna.

Used for boarding up the wall are panels made of mineral wool, faced on two sides with galvanized steel sheets each 0.75 mm thick, covered on the outside with synthetic covering, and within--protected with a layer of lacquer. The panels for boarding the deckheads consist of steel sheet 0.75 mm thick.

The panels to board up the wall and deckhead have special elements for their mutual reinforcement, making it possible to assemble and dismantle them rapidly. They can be used as fireproof bulkheads type V-15 and V-0, and also have soundproofing properties. The strength of the wall board panels makes it possible to attach to them elements of the equipment for the facilities without special support or reinforcement.

Installed as the main engines on the vessel are two 6VD S 48/42 AL-2 diesel types manufactured at the (Halberstadt) Maschinenbau Yard (GDR) with a rated power of 2650 kw (3600 h.p) each, with a rotational frequency of  $8.33 \text{ s}^{-1}$  (500 rpm). The diesels are piston, four-cycle, with gas-turbine supercharging and supercharged air coolers. They can operate on heavy fuel with a viscosity of 1500 Redwood 1 at  $50^{\circ}\text{C}$ . The engines have circulating lubrication under pressure, automatic for each diesel. The lubricating system has oil coolers. The gas turbine supercharger has non-autonomous lubrication. The main engines are monitored from the central control board.

The torque from each engine is transmitted through a reduction gear to the propeller shaft and to the shaft generator. Each gearbox is made up of two single-stage cylindrical gear transmissions with herringbone gears, built-in thrust bearing and a supplementary drive for the shaft generator. Each gearbox has an automatic lubrication system, cooled by sea water.

The vessel has two shaft lines about 26 m long each, consisting of a single tamping shaft, two intermediate shafts, a cone clutch, a mechanism to change the pitch of the VRSh [screw of the propeller pitch], a second cone clutch, and the propeller shaft. A screw-type stop takes the piston thrust, placed in the propeller regulator. Each of the tamping and intermediate shafts rests against the support slip valve, with a babbit filling, lubrication and water cooling, in the deadwood bearing with babbit filling and lubrication. Both shaft drives have an assembly to stop and crank them.

For the four-blade VRSh (left rotation at starboard and right rotation at port) the diameter is 2700 m. The blade position is changed hydraulically by the screw pitch. If there is no oil pressure in this system, the blocking assembly sets the screw pitch; it is possible to change screw pitch by pumping the system manually.

The vessel's electric power station consists of two auxiliary diesel-generators each with 500 kw·A power, operating at a rotation frequency of  $8.33 \text{ s}^{-1}$  (500 rpm) two shaft generators, 800 kw·A power each, combined with main engine reducers, operating at a rotation frequency of  $16.67 \text{ s}^{-1}$  (1000 rpm), as well as an emergency diesel generator with 255 kw·A power located above the vessel's upper deck. The auxiliary diesel-generator units consist of diesels type 8UD 36 /24 A-1K vertical structure, non-reversible, single-stroke four-point, trunk piston with turbo-charged and self-actuating generators, triple-phase current, voltage regulation and with built-in electronic activation assemblies (500 kw·A 390 V. 50 Hz) Both diesel generators can operate both singly and in parallel. They can operate in parallel with the shaft generator only temporarily with manual synchronization.

The shaft generators are actuated from the reduction gear of the main engines and are self-actuating triple-phase current generators with built-in electronic actuating units (800 kw·A, 390 V, 50 Hz) Each generator has a generator panel which houses the switching, the shield and the control.

The emergency diesel-generator consists of a diesel type 6UD 18/15 A-1 with a rated power of 224 kw and a self-actuating generator, triple-phase current with stabilizing voltage and a built-in actuating unit (255 kw·A, 390 V, 50 Hz).

Basic Specifications:

Length:

Overall . . . . .	125.9 M
Between perpendiculars . . . . .	117.5 M

Breadth . . . . .	16.2 M
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Draft:

For main navigation area . . . . .	4.00 M
Along load mark . . . . .	5.66 M

Displacement: . . . . .

With a draft of 4.00 M . . . . .	5850 T
With a draft of 5.66 M . . . . .	8955 T

Deadweight:

With a draft of 4.00 M . . . . .	1578 T
With a draft of 5.66 M . . . . .	4683 T

Speed . . . . .	16.2 knots
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The boiler unit consists of an auxiliary boiler and two waste-heat boilers. The auxiliary boiler, with steam productivity of 1000 kg/hr and two waste-heat boilers with a productivity of 600 kg/hr each can operate in the following ways: parallel operation of the auxiliary boiler and the two waste-heat boilers, parallel operation of both waste-heat boilers and operation of the single auxiliary boiler.

To fill the demand for compressed air, there are three compressors with cylinders, two vertical two-stage, two-cylinder piston compressors, medium pressure, with a suspended pump, cooling water and a productivity for a single compressor of 110 M<sup>3</sup>/hr.

The actuating air compressor is vertical, single-action, low-pressure U-shaped. The cooling is by air, the lubrication is centrifugal and the productivity is 160 M<sup>3</sup>/hr.

The desalinating unit for the sea water serves to produce fresh water from the sea water. The desalinator operates with a 93 percent vacuum. The cooling water of the main engines is used as a warming agent, and when operating in the reserve mode, the diesel-generator cooling water is used. The desalinator productivity is 12.5 tons per 24 hours.

The vessel has five automatic self-cleaning separators, located in special facilities. The two separators are designed to clean the lubricant, one--for the diesel fuel and two separators to clean the heavy fuel. The separators are type OZB/5-7.1 (GDR) with a productivity of 3.5 M<sup>3</sup>/hr each.

The vessel has a high-pressure carbon dioxide fire-extinguishing system. An air-mechanized foam extinguisher with 100-fold foam formation is also installed. The foam-extinguishing system is contiguous to the main water fire extinguisher.

The pipelines of the ballast-drying system are laid out along the pipe conduit and the drive shaft tunnel. The hydraulic valves are controlled centrally from the panel board.

In emergency situations, inflammable and toxic fluids can be pumped overboard with the aid of an ejector installed in the vessel's bow. The bilge main in the pipe conduit can be disconnected from the rest of the system for this purpose with the aid of a gate valve in the engine room.

The vessel has equipment meeting the requirements of the International Convention for prevention of pollution from vessels. A biological cleaning unit is used to decontaminate fecal sewage water, and to purify the bilge water--a special oil separator type TE 2.5 from the Turbolo firm, with filters ensuring a grade of purification up to 15 mg/l, and with a productivity of 2.5 M<sup>3</sup>/hr.

The degree of automation of the power unit and the auxiliaries ensures their servicing by a single man on watch at the central control panel while the vessel is under way, and off-watch service at the monitor station, which satisfies the requirements of the Rules of the Registry of Shipping of the USSR for vessels with an automation class A2.

The vessel is equipped with modern communication devices and electro-radio direction-finding equipment.

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CSO: 1829/235

## MARITIME AND RIVER FLEETS

### NEW RIVER FOODSTUFFS CARRIER DETAILED

Moscow RECHNOY TRANSPORT in Russian No 2, Feb 85 p 36

[Article by M. Avrukh, chief project designer at the Central Technical Design Bureau: "For Transporting Vegetables"]

[Text] The Plant imeni 40-y Godovshchiny Oktyabrya of the VORP [Volga United River Shipping Company], according to plan R168 worked out by the TsTKB [Central Technical Design Bureau] of the Minrechflot [Ministry of River Fleet] has built the head dry cargo diesel vessel ST-1351. The vessel, like the diesel vessel of the design 19620,\* is designed for transporting vegetables (tomatoes, potatoes and watermelon), fruits and grain as well as crated piece cargo on pallets, containers weighing up to 20 tons, lumber in bales and other cargo along main and lateral rivers with depths of at least 2 m.

The possibility has been foreseen of operating the diesel vessels on Lakes Ladoga and Onega, the Azov Sea and the Gulf of Finland under limited wind and wave conditions (with a wave height to 2 m) as well as passing through the locks of the Saimaa Canal.

The hull has ice reinforcing allowing the vessel to be operated in broken ice 20 cm thick and a compactness of 5 points.

The engine room is located in the stern, the crew superstructure and wheelhouse in the bow, while the cargo hold without transverse bulkheads is located between the superstructure and the engine room. The hull has a double bottom and sides as well as "potopchinas" [poss. flotation tanks] on the main and upper decks in the area of the cargo hold. The telescopic hatch covers provide 50-percent opening of the hold. For loading and unloading grain by the covered method, openings have been made in the hatch covers.

The bow of the hull has a spoon-shaped form while the stern is tunnel-shaped with a flush transom.

The positioning of the superstructure and wheelhouse in the vessel's bow provides better working and living conditions for the crew due to the low noise

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\* RECHNOY TRANSPORT, No 11, 1983.

and vibration levels which, as the testing has confirmed, meet the requirements of health rules. In addition, such a layout makes it easier to trim the vessel.

#### Basic Characteristics

Main dimensions, m:	
Design length . . . . .	83
Design beam . . . . .	12
Depth . . . . .	3.5
Draft . . . . .	1.8
Molded depth with draft of 1.8 m . . . . .	9
Number of berths for crew	
(including two spare) . . . . .	12
Power of main engines, kilowatt . . . . .	2x440
Fuel range, days . . . . .	10
Speed in quiet deep water, km/hour . . . . .	19
Cargo capacity, tons:	
With draft of 1.8 m . . . . .	800
With draft of 2.5 m . . . . .	1,400
Class of the RSFSR River Registry "O-PR" (ice).	

For the possibility of traveling under bridges along the route to the Moscow Yuzhnyy Port, it is possible to take on up to 800 tons of water ballast in the double-bottom space and the double-sided compartments.

The main engines are two non-reversing diesels of the 8NVD36/24A-1 type equipped with a two-fuel system and adapted for operating on motor fuel. Rotation to the propellers (a diameter of 1.7 m) is transmitted through a reversing reduction gear with a transmission ratio of 1:1.85 ahead and 1:1.75 astern. The diesels and the reversing reduction units are equipped with a pneumatic device for remote control from the wheelhouse as well as automation which provides no-watch servicing of the ship propulsion unit.

The ship electric plant consists of three diesel generators with a power of 50 kw and these can be started from the wheelhouse.

The vessel, in contrast to the vegetable-carrying diesel vessel of the 19620 design, does not have air conditioning and forced-air ventilating of the cargo holds and for this reason for preserving the vegetables a number of design and operating measures have been worked out. In transporting tomatoes there is a system of natural plenum-exhaust ventilation. On one side, between both "potopchinas" are intake ventilating heads and on the other, exhaust ones. The ventilating ducts in the cargo hold are located on the level of the double bottom. Only exhaust ventilating heads are located on the side coamings.

Actual testing showed, such a system of natural ventilation is sufficiently effective.

In addition, observing the operating measures is very important for preserving tomatoes. Before loading into boxes they should be inspected for meeting the requirements of State Standard 1725-68. It is not permitted to transport wilted, rotten or pest-contaminated fruit. The total number



of containers of the TKB-90U type in the hold should not exceed 1,150 units. They should be placed in four tiers. When necessary it is permitted to load into containers pallets with tomatoes in boxes (in one tier). A container holds 32 [boxes] and a pallet 64.

The air temperature in the hold should not exceed +20-25° C with a humidity of 85-95 percent. For ensuring such conditions with a high outside air temperature (up to 40-44° C), it is recommended that water ballast be taken into the inter-bottom and interside tanks of the cargo hold.

Additional ventilation for the cargo hold can be provided by moving the telescopic hatch covers 1-1.2 m from the bow and stern bulkheads.

During the two first trips of the vessel, the hold was ventilated in this manner twice a day: from 0500 to 0700 hours and from 2000 to 2200 hours.

The quality of the tomatoes delivered from various points of Astrakhan Oblast to Moscow by the first two trips of the diesel vessel corresponded to the standard by 93.3 and 92.8 percent. However, on the third, autumn trip this level was just 64 percent. This was explained by the poor quality of the loaded fruit as well as by the extended stoppages of the vessel in the ports (8-9 days).

The telescopic design of the hatch cover has made it possible to unload the vessel with three cranes simultaneously in the Moscow Southern Port.

The acceptance commission gave a positive evaluation for the technical operating qualities of the diesel vessel and recommended series construction of the vessels according to design R168.

For accelerating the output of the vessels, their building has been organized at two enterprises of the VORP. The cylindrical part of the hull (weighing 200 tons) with partial saturation is being manufactured by the Gorodets Ship Repair Yard. Completely welded and finished, it will be towed to the Ship Repair Yard imeni 40-y Godovshchiny Oktyabrya, where it will be raised in a building slip and joined to the bow and stern units manufactured at this yard.

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MARITIME AND RIVER FLEETS

BRIEFS

KERCH SHIPYARD BUILDING TANKER--Kerch--Large tankers under the flag of our homeland may be encountered at all latitudes of the World Ocean. These are creations of the shipbuilding specialists of Kerch's Zaliv Shipyard imeni B. Ye. Butoma. Yet another giant tanker, on the side of which is inscribed the name "40-letiyе Pobedy" ["40th Anniversary of Victory"], is being built on its ways today. The ship will be able to carry four kinds of petroleum products simultaneously. The tanker is being built with double sides, which will protect against the spilling of petroleum products in the event of an accident situation. The yard's builders will stage a labor watch in honor of the 40th Anniversary of Victory, and they have obligated themselves to end every shift with overfulfillment of quotas. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 23 Mar 85 p 1] 12319

PASSENGER LINER FROM GDR--(TASS)--The new passenger liner "Leonid Sobolev", built for the Soviet Union by shipbuilding specialists of the yard in Boizenburg (Schwerin District), has set out on many-day sea trials in the Baltic Sea. Ships of this series, construction of which will determine the production program of the yard's workers in the future also, will help increase the number of pleasure routes along the Dnieper, Don, Volga and Amur Rivers. The Soviet Union is the largest foreign customer for the river and maritime ships built at GDR [German Democratic Republic] yards. An agreement for the delivery of 53 ships of various types from the GDR to the Soviet Union during the forthcoming two years was signed at the International Spring Fair recently concluded in Leipzig. Among them are refrigerated trawlers, container ships, passenger motor ships and multi-scoop floating excavators. [Text] [Moscow VODNYI TRANSPORT in Russian 2 Apr 85 p 1] 12319

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## PORTS AND TRANSSHIPMENT CENTERS

### OPERATIONS AT NEW RIGA PORT CONTAINER TERMINAL

Moscow IZVESTIYA in Russian 16 Mar 85 p 2

[Article by D. Gefter: "Fast Berths"]

[Text] Riga--The new container terminal of the Riga Commercial Port has reached designed capacity ahead of schedule.

The captains of ocean liners coming to the berths of the Port of Riga are being guided now by not only by the spires of the ancient cathedrals of the city but also by the openwork of the booms of the powerful cranes standing on Kundzhinsala Island not far from the mouth of the Daugava. One of the largest container terminals in the Baltic has been built here. The Finnish firm "Kone" took part in fitting it out with modern equipment on a contract basis. In particular, the firm supplied the automated loading cranes having the height of a multistoried building.

The container ship "Kapitan Tomson" tied up at the berths of the terminal early in the morning. Now it is making its way along the "route of friendship" which connects Riga with the GDR Port of Rostock. The ship has delivered furniture and articles of clothing having the trade marks of the national enterprises of fraternal countries to the capital of Latviya. Instead of a planned seven, the container ship's command has completed eight voyages. In addition to what was assigned, 560 containers have been delivered.

The crew of the "Kapitan Tomson" has concluded an agreement of international socialist competition with the brigade of moorers and dock workers of the Port of Rostock, but in Riga, the brigade contract of the dock workers has become the basis of success.

With each day, the powerful new terminal is increasing the rate of processing cargoes. The comprehensive brigade of dock workers led by I. Smirnov takes each ship on contract and answers for it from the moment of arrival at the berth until departure. The brigade, which contains 70 experienced dock workers, is divided into five sections. Four of them work on shifts, the fifth is in reserve. It is led by the brigadier himself. He goes to work every day at eight in the morning and in time of need, when it is necessary to overcome a "tight situation", the people assist their comrades.

In the current year, the container turnover on the "route of friendship" is being increased by a factor of one and a half. The largest container ships in the Latvian Maritime Shipping Company, capable of taking 500 containers on board, operate here. The data processing center of the terminal assists the dock workers.

Just now, information has come in that the "Simon Bolivar" has moored at the berth. We ask the operator to yield the place before the display for a minute.

"Good day, ask your questions " the green letters broke out on the screen.

In 30 seconds, complete information on the number of containers on the ship, the kinds of cargoes in them, and the addresses of their recipients was given out.

"The creation of the data processing center was specified by the comprehensive program for the development of the Riga transportation center" said the chief of the IVTs [Data Processing Center], I. Sablin. The process of transshipping tens of thousands of containers, of controlling the loading operations, the planning, the analysis of the daily work of the terminal—these and many other problems now are done on a computer. Displays are installed for the port dispatchers and the cargo region of the railroads. One has only to obtain the specified code, to press the keys on the keyboard, and the machine will produce the necessary information for the operational supervision of the transportation center.

The motorship "Simon Bolivar" has departed on its next voyage. The display at the container terminal noted: the ship was processed earlier than scheduled by five hours.

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PORTS AND TRANSSHIPMENT CENTERS

PROGRESS, PROBLEMS AT NEW TALLINN PORT CONSTRUCTION SITE

Tallinn SOVETSKAYA ESTONIYA in Russian 1 Feb 85 p 2

[Article by the director of the New Tallinn Port now under construction, A. Ponomarenko: "Coordination of Efforts is Required"]

[Text] Entering 1985--the fourth year of the construction of the Port of New Tallinn--it is useful to sum up what problems have been successfully solved here and what problems are now coming to the fore in the first plan.

On the whole, from the point of view of fulfilling the projected indicators, one can be satisfied with the results achieved. The plan for the construction and installation work for 1984 was completed by the anniversary in September of the freeing of Tallinn from the German-Facist invaders. The berth for mineral construction materials was put into operation a quarter of a year earlier than envisaged by the socialist obligations. Thanks to the presence next to the berth of a special ramp, ships with both horizontal and vertical methods of unloading equipment and materials for the construction can be received in the port.

Today's capacity of the berth--150,000 tons per year--by the end of the first phase of the port (in 1988) should reach 400,000 tons. Incidentally, the first thousands of cubic meters of granite crushed stone for the ESSR DSRU Minavtoshosdora [Regional Administration for Road Construction of the Ministry of Transport and Highways of the Estonian SSR] and the Tallinn Non-metallic Materials Plant were unloaded here in the middle of December so that the pier already has begun to be useful to the national economy of the republic.

The first facility for the settlement for port workers in the northern quarter of the city of Maardu--a well constructed dwelling of 490 apartments--has been put into operation. In connection with its construction, practically all of the outlying networks for the future settlement had to be constructed; namely, waterlines, sewers, electric power lines and substations which will permit connecting domestic facilities to already laid communications in the future. This building later on will be occupied by the workers of the new port. Two more such dwellings will be built in the current year.

The work of the foreign firms is already visible. The first facility, a sewage treatment plant with a capacity of 2000 cubic meters per day which was entrusted to Finnish constructors, has been completed.

Finishing work has begun on the community building of the grain transshipping complex, the deep-water pier for the future berthing of ships with grain has progressed two hundred meters into the sea, the erection of the framework for one of the refrigerated storages for perishable cargoes is being finished, and the stories of the port administration building are rising. During 1984 48 million rubles of capital investment were assimilated and of that 27.8 million was by the foreign firms. Practically all participants coped with the established plan indicators.

But it is impossible to consider even such an impressive tempo as satisfactory because in 1985, it must at least be doubled. In fact, the port construction confronts the assimilation of 100 million rubles of capital investment. It is a problem which, at construction sites of the republic, has not yet been solved. In this, it must be taken into account that for the completion of such a volume of work, by the middle of 1985 about 2000 Soviet and foreign builders must be concentrated here. This fact alone speaks to the question of how complicated the problems are which confront the builders and the client in the production and social and domestic aspects. The living conditions, transportation and feeding of the participants in construction require care and daily attention from the services of the city and the republic.

As to the fulfillment of the contract with the foreign firms, the success of construction here will depend very much on the efficient and timely delivery of materials by the Soviet side, including a number of the republic's enterprises. This applies first of all to such materials as cement, sand, crushed limestone, and brick. The supply organizations of the republic will play no small role in making up and realizing the materials obtained by the funds allotted by USSR Gosplan for the construction of the New Tallinn Port. It is sufficient to say that for preparing the concrete mixtures, the foreign firms, every day, require 1200 cubic meters of crushed granite, 600 cubic meters of sand, and 140 tons of cement.

It is unfortunate that in 1984 the Finns worked practically without a reserve of materials--not just normal materials, even every-day materials. They took incoming materials literally right off the trucks. The principal operations are only now being speeded up and the demand for sand, crushed rock and cement is growing by several fold. Meanwhile, these materials should be delivered steadily according to schedules.

It is necessary to emphasize that the solution of this problem would be much easier if the approach railways to the port were activated. Despite repeated demands of the interdepartmental commission to open up operations, these railways, up to now, have not been prepared for operation. The leadership of the administration of the Baltic Railroad and Construction, Installation Train No 675 promise only to begin operation of the railway in 1986 which in no way corresponds with the interests of the builders. Meanwhile, the railway is

inactive, and the ESSR Ministry of the Construction Materials Industry is in no position to provide for steady delivery of the large number of cargoes which the contracts require.

Once again I suggest that the time allotted for the construction of the transshipment complexes is so limited, and the volume of work is so large, that an interruption of the construction process even for one week can be reflected in the final dates, not to mention the loss which such a delay inevitably brings.

So that this will not happen, from all appearances the time has come to create a coordinating council which includes the constructors, suppliers, and transporters who regularly would control the delivery of materials according to agreed dates and schedules. Actually, the supply of the construction is not connected with republic enterprises alone. We find a large dependence on the Krasnogorsk quarry administration, Glavlenstroyaterialov [Main Administration of Industrial Construction Materials of the Leningrad Council of the Executive Committee] and the Port of Vyborg in the delivery of crushed granite, and a dependence on the Krivoy Rog and Yenakiyevo metallurgical plants in the delivery of reinforcing rods. It appears that an agreement should be concluded on collaboration between the participants in the construction. Such a practice, as is known, has strongly recommended itself on many of the largest construction projects in the republic.

It also is impossible to forget that the New Tallinn Port is being constructed with the participation of foreign firms, and while their contribution to the volume of work in the first stage amounts to about half, according to the introduction of capacity, it is the principal portion.

Taking into account that the problems of the foreign and Soviet contractors are tightly connected, in our view, one of the participants in the proposed agreement on collaboration should be the foreign firms although this has not been the practice in construction.

The principal volume of work in 1984 by the general contractor--the Baltmorgidrostroy [Baltic Sea Hydraulic Construction Trust]--was done in such work as deepening and grading the grounds for the port; that is, machines did the main work. Now, on the general port facilities, demand is growing sharply for additional manpower resources. Of course, the winter period will affect the tempo of work--that is why the work done by Soviet contractors basically was connected with the hydrotechnical structures. This is why a clearly thought out organization of labor is needed as never before, as is daily contact with subcontractors who still are treated like stepchildren at the construction site. As is known, at any large construction project, especially in the period of its expansion, the success of at least half the work and sometimes more depends on subcontractors.

It is necessary to establish, however, that the leading general contractor, SU-423 [Construction Administration 423] still has not accumulated the experience of such a large construction project--the experience of interacting with subcontractors. The amount of work must be covered by the

capacities of the construction organizations--this is an axiom. Despite, however, our persistent pleas to the constructors, there still is no progress in that direction. Of course, a general contractor needs help in the solution of this problem. But his idea to create a special trust for New Tallinn Port, right now seems premature. The amount of work does not correspond with the structure of a trust. In all, SU-423 is engaged at the site in four facilities; namely, the berth for perishable cargoes, the second stage pump for the water lines, the berth for the port fleet, and the base proper. The USSR Ministry of Transport Construction is introducing new executives for the new facilities. This is why the creation of a trust is more prospective than a problem for today.

Baltmorgidrostroy organized at the construction site an operative group with the deputy manager of the trust at the head. In such a situation as this, it is necessary to strengthen the construction administration. These measures always have justified themselves before, especially in combination with the principles of "worker relays" and with agreement on collaboration of the participants in the construction. And such organizations of the republic as the NII [Scientific Research Institute] for construction of ESSR Gosstroy [State Committee for Construction Affairs] could arrange support to render substantial assistance to a general contractor.

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## PORTS AND TRANSSHIPMENT CENTERS

### PROBLEMS OF SAKHALIN SHIPPING COMPANY PORTS

Moscow VODNYI TRANSPORT in Russian 20 Apr 85 p 2

[Article by the chief of the port service of the Sakhalin Maritime Shipping Company, V. Talanov: "Accounts and Miscounts"]

[Text] There are three transportation centers in the Sakhalin Shipping Company. The Ports of Kholmsk, Korsakov, and Vanino with the local railroad stations and motor vehicle transport enterprises operate on the basis of mutually coordinated continuous planning. Nevertheless, far from all potential capabilities have been utilized. And here is why. Our transportation centers operate under specific conditions--two of them are situated on the island, and one is on the continent--owing to this, difficulties of an organizational nature arise. For instance, the Port of Vanino, according to territorial division, belongs to Khabarovsk Kray, but the trade union organization is part of the Amur baskomflot [maritime and river fleet workers trade union committee]. It has come to pass that our Sakhalin baskomflot, in the organization of socialist competition between the transportation centers, cannot stimulate the interest of port workers of the continent. But, actually, almost half the cargo processing volume of the shipping company falls on that port.

On the other hand, the partners of the island transportation centers cannot count on the rapid assistance of the central departments because of their remoteness. Therefore, they frequently are forced to rely exclusively on their own efforts and capabilities in strengthening the material and technical base, and in improving the storages and approach routes.

But, despite the organizational difficulties, the transportation centers in recent times have achieved pretty good results.

In the ports, the volume of loading and unloading work is steadily growing. Thanks to the improved exchange of information and the increased quality of the planning, the operations of the transportation centers annually are overfulfilling assignments for the transshipment of through cargoes. In the past year, 10,254,500 tons were processed by this method when the plan was for 9,556,000 tons.

The coordinating councils of the transportation centers and the working groups for joint planning and analysis of the operations of the port, the railroad stations, and motor transport, on the whole, are providing current guidance to the whole transportation process. The coordinating councils weekly analyze the results of the activities of the centers, and approve comprehensive measures for the further improvement of joint operations on the basis of continuous planning. Quarterly, they sum up the socialist competition and compose the annual plans for social and economic development.

Attention is being given to new forms for the organization of labor and socialist competition. For example, united comprehensive dispatcher shifts have been created for ports and stations between which labor rivalry has opened up. Everywhere the brigade contract is being used and also brigade cost-accounting is being introduced.

Annually, with the representatives of the Sakhalin and Komsomolsk Divisions of the DVZhD [Far Eastern Railroad], the port workers conduct an inventory of the fronts for the loading and unloading of rail cars and reconsider the points of agreement. The shipping company and the DVZhD administration have established monitoring over the inflow of requests for rail cars; and, to more fully utilize the rolling stock, a supplementary work force is being enlisted from other ports in the country and from the Korsakov Seafaring School.

Adding important publicity to competition, all the enterprises of the transportation centers have stands with the indicators of the work of the interfacing workers. The results and the progress of the competition are elucidated in the local and oblast press and also in the large-edition newspaper, SAKHALINSKIY MORYAK. Taking upon themselves obligations for the repair of railroad rolling stock, the port workers have restored 367 rail cars and 1808 containers in the past year.

But, despite the superficial well-being, a series of fundamental problems in the transportation centers has not been solved. And this is not explained by the organizational difficulties mentioned above.

In the course of a number of years, the Sakhalin Division of the railroad and our shipping company has obtained, through USSR Gosplan and Gosplan, supplies of wheel sets for rail cars in order to increase the stock of continental rail cars on Sakhalin, where there is a narrow gauge.

The DVZhD administration, however, has not cooperated. As a result, hundreds of expensive and scarce wheel pairs are blocking up the points for the interchanging of cars on the island and the train ferries lie idle awaiting the preparation and delivery of the rolling stock.

The Far Eastern Railroad requires that rail cars arriving on Sakhalin be returned to the continent without fail only on "their own" wheel pairs. Therefore, such pairs, sometimes delay by weeks "their own" rail cars at the point of interchange which increases the time for interchange and, as a consequence, the throughput capacity of the ferry complex is reduced.

At the end of 1983, the USSR Committee of People's Control revealed serious deficiencies in the delivery of cargoes to the Magadan Oblast. In this connection, measures were adopted by the coordinating councils which improved the quality of planning the operations of the fleet and ports and which brought the plans for the loading and unloading work in the ports and the hauling of cargoes into correspondence with the assignments of USSR Gossnab. The responsibility of the port administrations and ships was increased for the composition of cargo plans and monitoring the stacking order of cargoes. In the Port of Vanino, the proposal of the port of Magadan is being taken into account about the loading of cargoes into the holds of motorships according to their quantity and nomenclature which has permitted reducing the number of ships coming under processing with complicated cargo plans and also has permitted utilizing more efficiently the Magadan motor vehicle transport organizations in the removal of cargoes from the port.

For all that, the Vanino Port operation does not satisfy us seamen. The main trouble is the irregular delivery of cargoes. As a rule, in December and January a shortage of rail cars enroute to Sakhalin via the ferry crossing leads to demurrage of the diesel-electric ships and to an above-normal accumulation of cargoes. And in April to June insufficient cargoes are delivered into port for the Magadan route and ships underloaded. As usual, a low amount of cargo is being shipped in containers or packets by the shippers, especially by Minzag [Ministry of Procurement]. As a rule, wheeled equipment is delivered to the Port of Vanino in the first half of the year in the period of the heaviest ice conditions when it is impossible to use Ro-Ro [Roll-on/Roll-off] ships which are not approved for navigation in ice. The plan for the delivery of cargoes into Magadan is not balanced with its removal by motor vehicle transport which brings about chronic overstocking of the storages here and reduces the intensity of the processing of the fleet.

Suppliers are not fulfilling the requirements of the GOSTs [State Standards] on containers and packaging, whence there is commercial wastage, and excessive expenditures of time and labor resources for reworking of containers and cargoes. USSR Gossnab frequently forgets about the fundamental decree of 10 January 1983 in the section for the shipment of cargoes only to the addresses of 88 recipients of the Magadan Oblast.

Glavflot MMF [Main Administration for Transportation and the Operation of the Fleets and Ports, Maritime Fleet Ministry] should be persistent in solving the problem of the packaging of cement imported from the KNDR [Korean National Democratic Republic] into the Magadan and Sakhalin Oblasts. The realization should be accelerated of arrangements with the Ministry of Communications for the allotment of additional channels to provide for the automated exchange of cargo information between the Ports of Vanino, Nakhodka, and Magadan.

It is necessary to accelerate implementation of the MMF Collegium decision to provide the Port of Vanino with duplicating equipment to increase the quality of cargo documents and to reduce the time for their preparation. Funds for the building of additional storage compartments at the port of Vanino have not been allotted for 1985, although the Collegium of the MMF has approved this expenditure.

It is troubling that these and other problems, both for seamen and the interfacing workers of the transportation process, are put before the appropriate departments over a long time and repeatedly, but progress as yet is small. This lowers the throughput capacity of the transportation centers, and their potentials are far from being fully utilized. But in fact, our ports have modern equipment. Ready and working here are first class dock workers and dock machinery operators, among them the UKB's [Versatile Comprehensive Brigades ?] of Laureate of the State Prize of the USSR, N. Shantsev, and of Hero of Socialist Labor and Deputy to the Supreme Soviet, P. Kostyuchenko, and many others.

In other words, Sakhalin seamen are prepared to make new advances, but we must have a little help. From that the whole national economy of the Far East will gain.

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## PORTS AND TRANSSHIPMENT CENTERS

### MAGADAN PORT BLAMED FOR SAKHALIN SHIPPING DIFFICULTIES

Moscow VODNYY TRANSPORT in Russian 14 Feb 85 p 2

[Article by A. Antonov, chief of the Fleet Operations Administration of the Sakhalin Maritime Shipping Company: "The Magadan 'Knot'"]

[Text] The Magadan route holds a goodly proportional amount of the total transport operations of the Sakhalin sailors. Regardless of the difficult navigation conditions, year-round they deliver to the northern oblast diverse, vitally important cargo from sewing needles and food to motor vehicles and nuclear reactors.

Still the fleet has systematically not fulfilled the established quotas for shipments. Why is this? This question is analyzed in the article published below.

Let us take the operations log of the KhEGS-2 [a group of ships] operating on the Magadan route for the fourth quarter of 1983, let us leaf through the pages and stop at random on any day of the previous navigation season. For example, the following situation existed on 18 October. Three of our vessels were being worked at the Magadan Port four were standing by in the roadsteads awaiting a free berth wall and another two were approaching. In other words, all nine diesel vessels were concentrated here which had been assigned by the shipping company according to the cargo shipping plan. The schedule had been upset. And the entire transport process was in turmoil. The Vanino Port workers, left without a fleet, were sending an avalanche of alarm signals to all offices: the dock workers and equipment were standing idle, and freight for Magadan was piling up.

In order to find a way out of the situation, we were forced to take vessels from other routes and shift them to Vanino. The shipping company and its clients suffered losses from this reallocation which had not been provided for in any schedule. On the other hand, the "jam" in the Magadan Port increased. Thus, last year fleet stoppages awaiting berths were 588 vessel-days and this meant that some 141,000 tons of general cargo were not moved.

Unfortunately, the capacity of the Magadan Port remains very low still. In the city there are 88 large and small cargo recipients. They chronically cannot

handle the removal of the cargo by motor transport and the port is reminiscent of an enormous warehouse. The goods lie on the shore while vessels stand in the roads with full holds. As an average one transport unit of the shipping company is processed in 8-9 days and this is double the norm.

If one examines the fleet processing dynamics by months, then one is struck by the following alarming trend. According to the approved schedule-plan, the Magadan dock workers should transload 8,000 tons of cargo a day, including 6,000 tons of general cargo. So, in the winter and the start of the spring of 1984, when the navigation conditions were particularly severe because of storms and the ice situation, the fleet was processed more intensely. For example, in March 7,950 tons of cargo were moved from the water to the shore per day, including 5,350 tons of general cargo. But in the summer, in the best period for the work of the sailors, the situation deteriorated sharply. For instance, in July, the northern port workers received just 4,775 tons per day.

The main reason for all of this is the low capacity of the port as the cargo recipients operated only during the day and at night closed down their depots. There were not enough dock workers at the berths. Possibly we could make up for the lag in the autumn and at present, in the winter, but this was impossible and the "debt" of the sailors increased further. As a whole, starting in 1980, the shipping company failed to deliver over a million tons of high-rate cargo to Magadan. Millions of rubles of income have been lost.

Certainly we are not trying to shift the blame for the irregular delivery of the fleet for processing in the ports. Here there are grounds for some hard thinking and work. But the Magadan "knot" has been pulled too tight and without the aid of the others involved in the transport process it cannot be loosened.

Let us look at the future. As is known, the Vanino Port is the northern gates of the BAM [Baykal-Amur Mainline]. The flow of cargo arriving here has been constantly rising. As the zone along the mainline is developed, considering the intense growth of the productive forces in the Far Eastern and Far North economy, including that of Magadan Oblast, it will be advisable to invest money in a regional railroad from the Magadan Port to the bases of the main, largest cargo recipients. This would make it possible, in our view, to fundamentally solve the problem of the berth capacity as well as raise the question of organizing a permanent Vanino--Magadan ferry line.

We would like to know the opinion of the USSR Gosplan on this possible project.

Time does not wait. In order to rectify the situation, we are seeking out internal reserves. One of them is to develop packet and container shipments. For example, up to now the MPS [Ministry of Railroads] has not been delivering in containers all the cargo planned for this. Laxness has also been shown by the Ministry of Procurement which still delivers a large portion of the feed grains in bags.

In endeavoring to somehow change the situation for the better, at the Port of Vanino we have organized our own containerization, however, one would agree the freight shippers should provide more energetic help in this direction.

The Coordination Council of the Magadan Transport Center must pay more attention to increasing the port's capacity as the council is not providing any help in establishing steady operations of motor transport and the cargo recipients. As a result, the fleet is not processed at the berths within the stipulated time.

The shipping company is also counting on help from the staff of the sector. There are not enough packet transports of the "Pioner Moskvyy" class. In the summer, such vessels are transferred from the Magadan route to the Arctic.

Regardless of repeated requests, Glavflot [Transportation and Operation of the Fleet and Ports MA] has been in no hurry to allocate the Sakhalin workers the necessary number of roll trailers for two dry cargo RO-RO vessels.

Several words about planning. Practice shows that the requests of Severovostok-glavsnab [Main Supply Administration for the North East] each year are not met. For example, over the 8 months the port of Vanino did not receive 133,000 tons of pipe and hardware. But we plan the fleet for this amount!

The impression is gained that the customers pull the figures out of the air. How else can one explain such a curious detail: as was already mentioned, the shipping company since 1980 has failed to transport more than a million tons of planned cargo but no enterprise has suffered from this except ourselves, the sailors. This means that this "million" was ordered by the recipients "for a rainy day," following the principle: "Request more because less will be given and then you will get just what you want!"

The correct and prompt resolving of these urgent questions will make it possible to untie the Magadan "knot" and improve the qualitative and quantitative indicators of transport work on this crucial national economic route.

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## PORTS AND TRANSSHIPMENT CENTERS

### MECHANIZED CARGO TRANSFER DEVICES NEEDED FOR RIVER PORTS

Moscow VODNYI TRANSPORT in Russian 23 Feb 85 p 3

[Article by N. Seleznev, chief engineer of Giprorrechtrans [Main Design Institute for River Transport] and V. Chebotkov, chief of the River Port Design Department: "Along the Path of Progress"]

[Text] It is an indisputable fact that the saturating of the ports with heavy-duty crane equipment has been accompanied by a drop in their use over time. Under the conditions of the increased cost of crane equipment and the constant shortage of manpower, a further increase in the number of cranes begins to tell negatively upon the economic indicators of the ports. What is the solution?

#### An Integrated Facility Helps

In order to improve river transport operations, it is essential to shorten the stoppages of the transport fleet in the ports: above all by increasing the intensity of its cargo working, improving the system of complete servicing of the fleet, by managing the operations of the fleet and the ports and by coordinating all the types of transport in the transport centers.

One of the main areas for solving this complex problem is a constant improvement in the methods of port cargoworking on the basis of employing new, highly productive equipment and cargoworking installations, introducing progressive production processes for cargoworking using the available equipment, and developing the transport-production systems for the through delivery of freight from sender to recipient.

The major coal transshipping installation which is presently being built at the Port of Kambarka according to plans worked out by Giprorrechtrans can serve as an example of such a technical solution. The facility is designed to transship from rail transport to water some 3.9 million tons of Kuznetsk coal over a navigation season. The coal is to be delivered in direct combined rail-water transport for supplying the thermopower plants of the Volga, Central and Northwestern industrial regions.

The plans for the coal-loading facility envisage a high degree of automating the transshipping process, industrial television and modern means of communications.



The entire coal facility will be operated by a team of 14 men per shift. In order to provide the necessary sanitary working conditions for the production personnel and to meet the requirements for protecting the environment against pollution, there are plans to install powerful aspiration systems in the areas of the car unloading equipment and transloading centers, sprinkling systems for wetting the flow of coal on the conveyor belts, hydraulic cleaning of the conveyor galleries and transloading centers, the collection and removal of production, domestic and rain effluents into treatment facilities.

Long, Long....

An important long-range direction for improving the structure of the fleet of transshipping equipment in the ports is to gradually replace the clamshell cranes at the existing bulk cargo piers having constant cargo turnover with a range of highly productive transshipping machines, including cyclical and continuous transloaders, stackers, rotary excavators, hopper units for batched loading of railroad cars and vehicles as well as cleaning equipment.

The work being done in the sector in this area cannot be recognized as meeting the needs of today. Here are the facts. The Mintyazhmash [Ministry of Heavy and Transport Machine Building] has failed to meet the established dates for delivering to the river ports clamshell-hopper loaders with a productivity of 800 tons an hour.

The dates for manufacturing a prototype of a floating bucket-chain conveyor loader with a productivity of 1,500 tons an hour for unloading mineral and construction cargo at the Gorkiy Port have been unjustifiably drawn out.

Development has not been started on designs for hopper units for loading railway cars and motor vehicles and a stacker for operating together with the bucket-chain conveyor loader.

The question has not been settled of purchasing a batch of rotary excavators for their experimental testing under operational conditions of the ports. Similar machines are being successfully employed to dispatch various bulk freight from warehouses to motor transport, for example, at the Bobruysk River Port of the Belorussian GURF [Main Administration of the River Fleet].

#### A Problem Stymied

In the future five-year plan, we expect a significant increase in the volume of bulk shipments by river transport of chemical and mineral fertilizers, including finely ground potassium chloride and powdered lime.

At Solikamsk and Berezniki they plan to put into operation mechanized berths for loading onto river transport up to 800,000 tons of bulk potassium chloride. The handling of this cargo flow will require a solving of complicated technical problems related to the anticorrosion protection of the fleet and the organizing of fertilizer transloading at the destinations.

At present, none of the operating general or nonpublic ports possesses equipment for unloading potassium chloride and powdered lime from the vessels in

observing rigid sanitary standards. This circumstance makes particularly pertinent the problem of developing port transshipping systems and equipment with an enclosed transporting tract.

A significant portion of the cargo flow of chemical fertilizers should be distributed over numerous river depots of Sel'khozkhimiya [Agricultural Chemical Administration]. The research and studies carried out by the LIVT [Leningrad Water Transport Institute] and Giprorechtrans have shown the economic advisability of self-unloading vessels for handling such loose cargo. However, virtually no work has been done in this area.

#### Heavy Crumbs

The problem of cleaning the vessels and railroad cars of the remnants of bulk cargo has not been fully solved. More than 8 percent of the expenditures of manual labor go for performing cleaning operations in the vessels and cars. The labor intensiveness and time of cleaning individual types of vessels exceed the labor and time expenditures for unloading the basic bulk of the cargo. Using the domestic wheeled and caterpillar bulldozers as well as the imported Clark and Case skip loaders in cleaning operations makes it possible to only partially solve the problem.

For its final solution there must be concerted effort by the scientific research and design organizations and the port workers. The operation of a number of Soviet and foreign ports shows the advisability of widely employing raking grabs during the entire stage of unloading the vessel or at its final stage. However, the fleet of raking grabs existing in the ports is clearly insufficient both in terms of number and type. Studies by the TsNIIIEVT [Central Scientific Research Institute for the Economics and Operations of Water Transport] and the GIIVT [Gorkiy Institute of Water Transport Engineers] have established the basic ideas for floating and shore cleaning facilities and the economic advisability of employing them in major ports has been set. At the same time, the practical realization of these proposals, even for experimentation, is being held up.

#### Better in Packets

In the area of improving the methods for transporting and transshipping at ports of crated-piece and lumber cargo, the main area is the greatest possible expansion of containerization and packeting of the shipments, and organizing through transport-transloading systems for delivering the cargo from the sender to the recipient without intermediate redoing of the cargo areas enroute and the extensive use of automatic and semiautomatic cargo-gripping equipment, and in the more distant future, industrial robots.

In 1983, around 46 percent of the total manual labor expenditures went to perform at the ports jobs involved in unloading from the rail cars and loading onto ships unpacketed crated-piece cargo and the internal port making up and breaking down of the packets. This shows the urgent need to intensify work on the greatest possible development of container and packet shipments, the volume of which by the end of the current five-year plan should be brought up to 15 million tons for the RSFSR ports. The effectiveness of this work is confirmed by the experience of organizing cement shipments in packets in heat-shrink film from the

Korkino, Sukhoy Log and Chernorechenskiy plants with transloading at the ports of Omsk, Tobolsk and Surgut and from the Estonian Tsunande Kunda Cement Plant via the Tallinn and Leningrad Maritime Commercial Ports.

The cement packets in heat-shrink film are transported by rail in open rolling stock and can be stored at warehouse areas. This circumstance is particularly important for the recipients in remote northern regions, where the warehouse and road systems are not sufficiently developed and there is a problem of protecting the cargo and returning the packaging materials.

According to the data of the Omsk River Port, the labor intensiveness of handling the packetized cement has been reduced by 1.5-fold, labor productivity in unloading the cement from the cars has risen by 60 percent. According to information of the Tallinn Maritime Port, the stoppage time of the vessels for loading has been reduced by 10 percent. The measures being worked out by the Novosibirsk Water Transport Engineers Institute together with the Ob-Irtysh United Shipping Company to optimize the weight of the bale and for locating the bales in the means of transport will make it possible to further raise the effectiveness of these shipments.

Another promising area is organizing the shipping of open-stored cargo in consolidated packets weighing 20 tons gross on container flatcars. The additional expenditures for acquiring the large-tonnage flatcars are repaid in 2.8 years.

The collection of standard production processes worked out by Giprorechtrans upon the request of the Main Port Administration should help in introducing in the river ports a unified, fully developed and optimum system of transloading operations for the corresponding conditions and, on the basis of this, accelerating the processing of the fleet, railway cars and motor vehicles. The standard production processes are a compulsory guiding material designed for the elaboration of flowsheets in the river ports and for planning measures to improve the transloading operations, to introduce more advanced equipment and standardize their design.

Further work in the area of analyzing the production methods employed in the ports, their standardization and the improving of the guiding production specifications is to be concentrated on working out flowsheets for transloading work (RTK) which will be standardized for similar conditions.

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PORTS AND TRANSSHIPMENT CENTERS

BRIEFS

YUZHNY PORT COAL-ORE COMPLEX--The first part of the coal-ore complex has begun operation in Yuzhny Port. Builders of the Black Sea Hydraulic Construction [Chernomorgidrostroy] Trust have erected over 400 meters of the fifth wharf. This is enough to permit processing over one million tons of dry bulk cargo a year. But altogether, upon activation of the complex, delivery of which is scheduled for the end of 1986, it will be possible to process about six million tons of cargo. [By Ya. Vel'ts] [Excerpt] [Kiev RABOCHAYA GAZETA in Russian 15 Feb 85 p 2] 12319

NEW NOVGOROD PORT PLANNED--The Novgorod River Port will change its address and "move" to the other bank of the Volkhov. The plan for its relocation and expansion was developed by specialists of the Leningrad State Institute for Planning River Transport [Lengiprorychtrans]. Nowadays the port, which processes about 4 million tons of cargo and serves over 400,000 passengers a year, is located at the very center of the ancient city. Its further development here has become impossible. That is why a decision was made for new construction in Derevenitsy Settlement, where the first elements of the new port have appeared already. [By V. Voronov] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 17 Feb 85 p 2] 12319

VOSTOCHNY PORT CONTAINER BERTH--Port Vostochnyy (Maritime Kray)--A wharf for processing international maritime shipping containers is being constructed ahead of schedule. Its area is equal to 18 hectares [44.478 acres]. They rightly call Vostochnyy Port the ocean gateway of the Baykal-Amur Mainline Railroad [BAM]. When the new mainline facility is placed in regular operation, the flow of various cargoes to countries of the Pacific Ocean Basin will increase. Experienced specialists are working on this project--N. Golovko's brigades of afloat construction mechanical detachment [plavstroyemekhotryad] No 23, V. Tsiberta from Far Eastern Maritime Installation [Dal'mormontazh] and others. Powerful gantry cranes are being installed at the same time. [By N. Artapukh] [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 16 Mar 85 p 1] 12319

VLADIVOSTOK CONTAINER TERMINAL OPERATIONAL--Vladivostok--The honor of opening the shipping season to Chukotka ports was given to motor ship "Bratsk". She went to the wharf of Vladivostok Maritime Commercial Port's new container terminal for loading. Here everything is ready for intensive processing of arctic cargoes. "Appearance on the line of six powerful motor ships of the "Noril'sk" type, each of which is capable of replacing nine ordinary ships in

terms of productivity, entailed reconstructing and technically re-equipping arctic wharf facilities," said Deputy Chief of the shipping company G. Pikus. "A deep-water wharf, accepting heavy-cargo motor ships, has been placed in operation in Provideniya Port, and three others are being lengthened. They are outfitted with the most modern equipment for handling heavy-cargo containers. Four wharves are being reconstructed in Anadyr. It is here that a co-operative base for repairing the minor fleet [harbor craft] of all Chukotka ports has been established." [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 6 Apr 85 p 1] 12319

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## EXPERIMENTAL SYSTEMS

### SCIENTISTS DESIGN 300-HP ENGINE WEIGHING ONLY 100 KILOGRAMS

Moscow GUDOK in Russian 5 Mar 85 p 4

[Article by L. Miloslavskiy from Moscow: "Don't Fear Experimentation"]

[Text] This title ["Don't Fear Experimentation"] was taken from a stand in the Moscow Institute of Agricultural Production Engineers imeni V. P. Goryachkin. This is a quotation from the "Memorandum on the Scientific Organization of Labor." And in actuality, a proper place in the scientific work of the VUZ has always been given to serious and bold experimentation. Proof of this is one of the projects of the tractor and motor vehicle department and which promises to become a discovery.

Imagine a power unit which can develop the power of a K-701 tractor engine but weighs almost 4-fold less than the "heart" of the giant of the fields. Add to this the capacity to operate on any type of liquid or gaseous fuel and to start virtually instantaneously. What is this? A fantasy picture? Tomorrow?

"No, it is today!" feels Mikhail Mikhaylovich Makarov, docent in the department. "Our work of developing such an engine is already coming to an end. It started several years ago when we began to solve the scientific and technical problem of developing a low-toxic power unit for agriculture which could be employed in mobile power plants. As the basis we took a compressorless, free-piston gas generator. This in essence is a piston-turbine engine which successfully combines two independent designs: a diesel and a gas turbine. The operating principle of such a unit and its design features were patented in our nation for the first time in 1976 (Certification of Invention No 776148). We wanted the engine to pollute as little as possible with toxic fumes the air which we, the plants and the animals breathe and that it be usable in the North.

"As is known, the promise of any theoretical design can be fully assessed only in the process of its practical development. Our research was the best proof of this. The project underwent further development. Now, when we are building the prototype, it can be said that the success has gone beyond the limits of the initially posed goal. Although the testing has not yet started, certain results of our work can be appraised even now. Take a look."

I actually did succeed in lifting it off the cement floor of the laboratory. The 300-hp engine does not weigh over 100 kg. It is a small unit of cylindrical

shape. On its ends are turbines and inside a piston which can move from end to end. Thus, two combustion chambers are obtained at both ends of the piston. Now it is not difficult to imagine the engine's operating principle. The gases formed in the combustion chamber not only move the piston but also drive the turbines.

What are the operating indicators of the engine? In operating, as was already said, on any grades of fuel, the engine reaches rated power, consuming the fuel very economically. It consumes not 175-170 gm of fuel per hour calculated per horsepower (this is the best performance of tractor diesels) but rather 150 gm. Incidentally, in the future this will be even less. Special research has also shown that as a result of the more complete fuel combustion in the cylinder, the content of toxic substances in the exhaust is significantly less than the usual. Lubricant consumption has also been minimized as a dry graphite lubricant has been employed. Complete disassembly and assembly takes very little time and it will be simple to replace the worn out graphite sections. Finally, the simplicity of design, the lack of complicated assemblies and auxiliary systems and, as a consequence of this, the reduced overall weight are a reserve for saving metal.

"Mikhail Mikhaylovich, what explains such high performance and economy of the engine? What are its advantages over a diesel and a turbine?"

"For internal combustion engines, the most economic process is, of course, a diesel one. But the mechanical linkage of the piston with the crankshaft mechanism does not make it possible to realize all its advantages, as it permits work only with a constant degree of compression. But in our design, the piston moves freely along a guide, the engine can operate with different degrees of compression and with automatic self-control. That is, any grades of fuel are good for it. A disadvantage of the turbine is in its low economy and this cannot be said about a piston-turbine engine."

"And where can the new power unit be employed?"

"In any sector of the national economy. I am not inclined to idealize the design. Problems can still arise in the process of its introduction and operation. But here are scientifically sound data not taken from the realm of fantasy: all 112 types of engines which are produced by the USSR can be replaced by two types of piston-turbine ones. For example, our most powerful ship engine of 21,000 hp weighs 762,000 kg. Several of our-type engines producing the same total power would weigh just 2,000 kg. In replacing 100,000 locomotive diesels [?with the] 1D12-400 (15/18) engines, the savings would reach 483.8 million rubles. One other major problem would also be solved: the five grades of gasoline and eight grades of diesel fuel produced in the nation could be replaced by one."

For any innovation, particularly in technology, there is no easy path. Diesel, in inventing his engine, left his successors, seemingly, not so many opportunities for improving it. But here is a new design which opens up remarkable possibilities. The prospects of introducing it into production are hard to overestimate. The problems which are partially solved here such as the saving of fuel and the combating of environmental pollution are pertinent today as never before. And although it is not time to speak of concrete results, one would like to believe that there is a great future for the design developed at the Moscow Institute for Agricultural Production Engineering.